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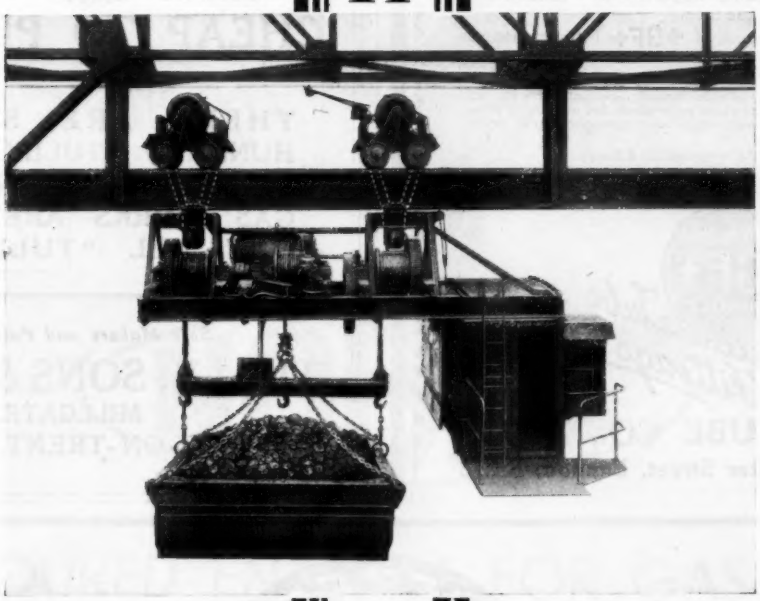

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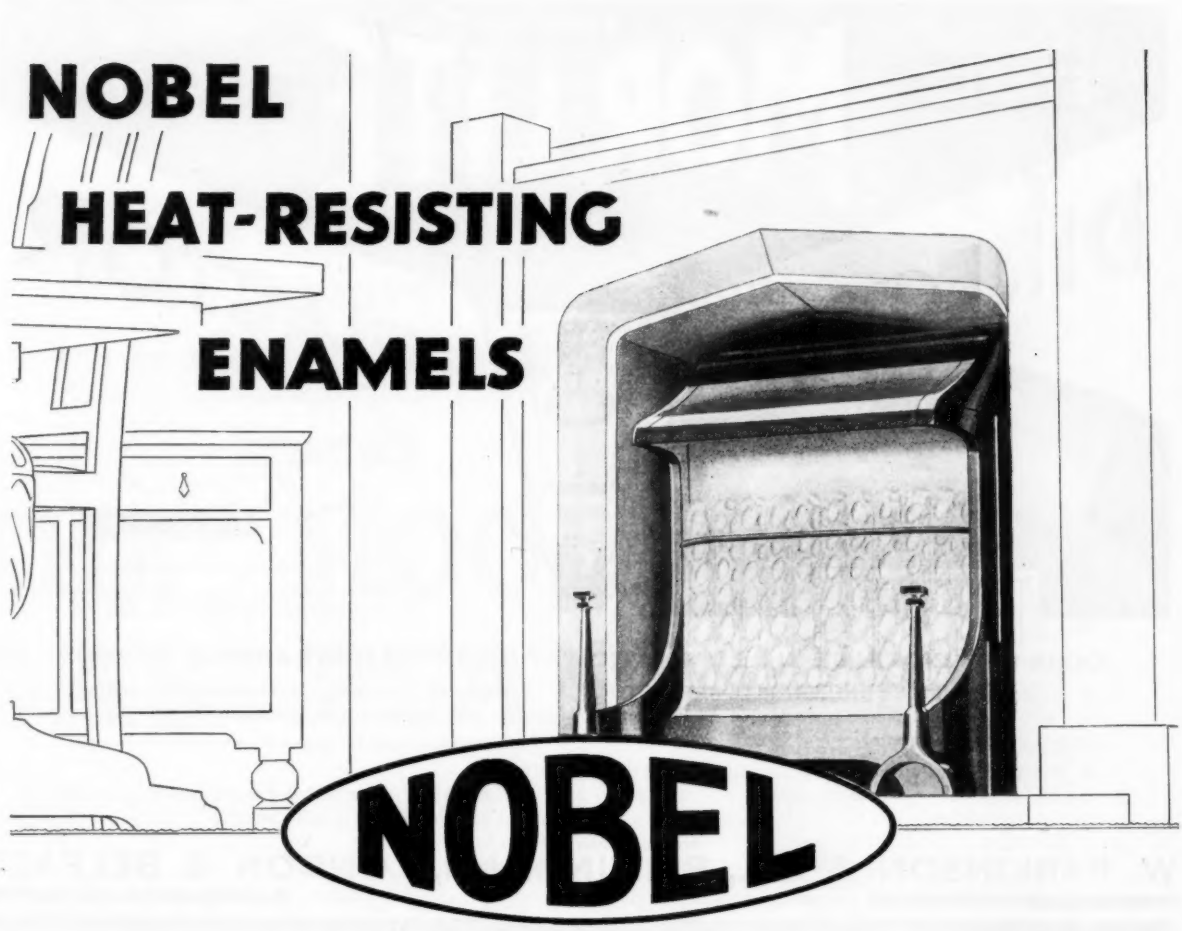

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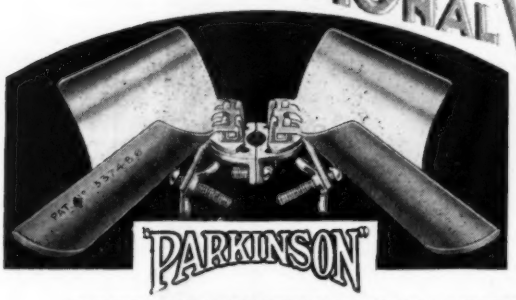

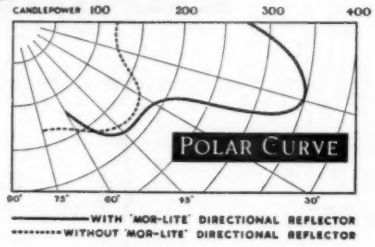
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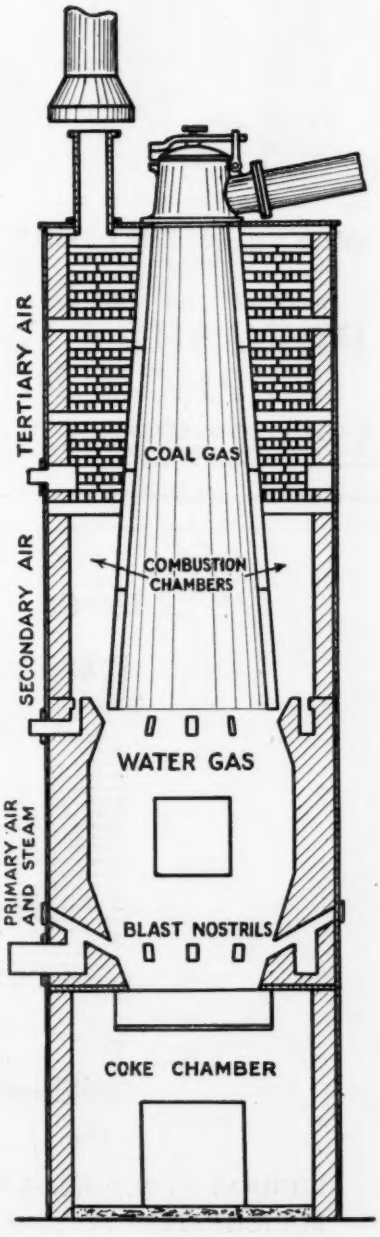

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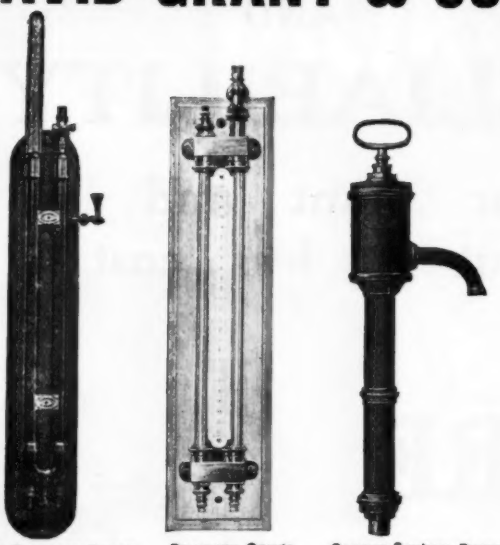

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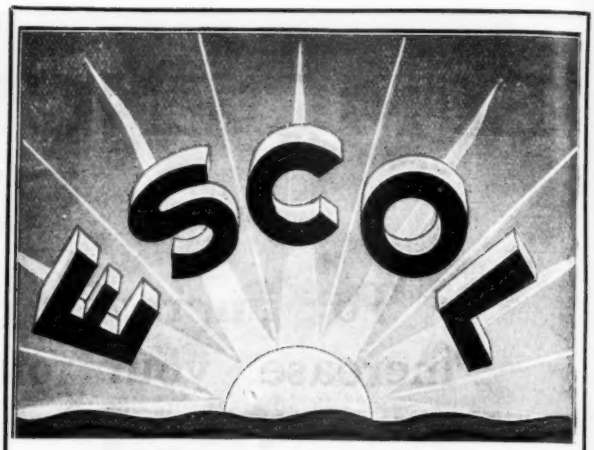

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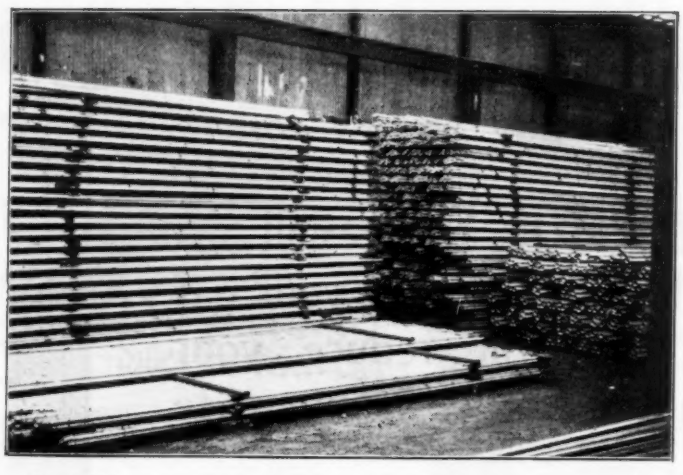

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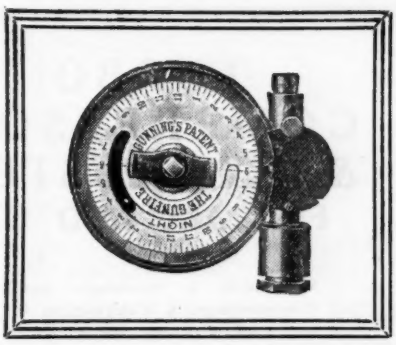

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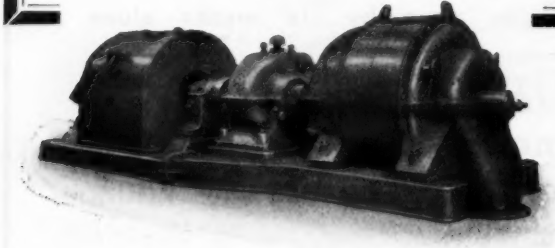

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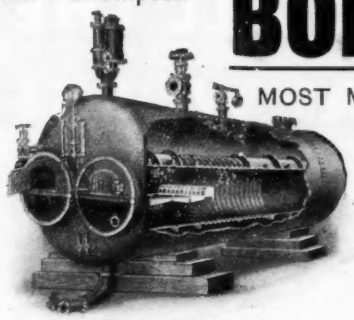

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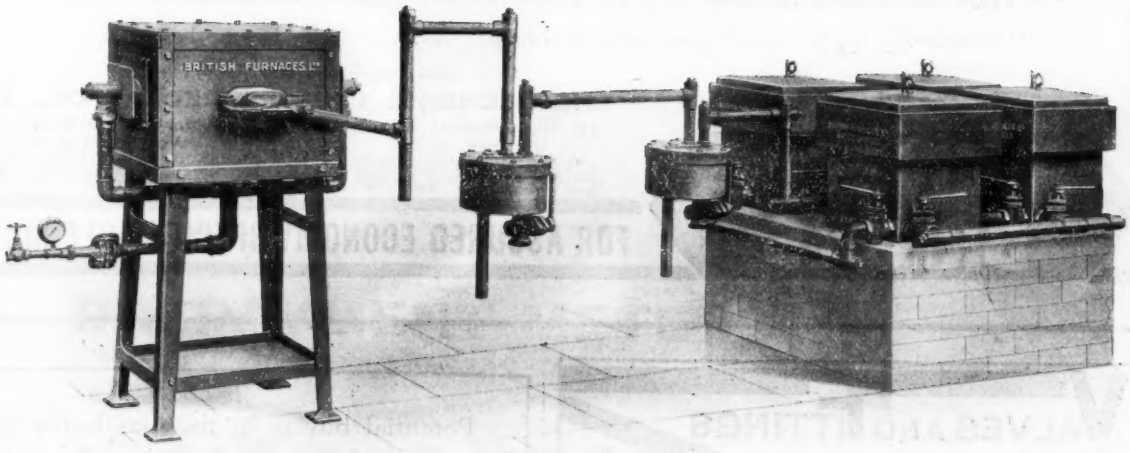

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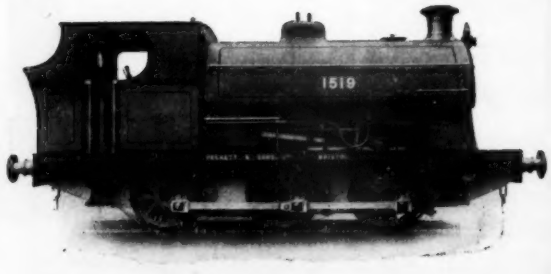

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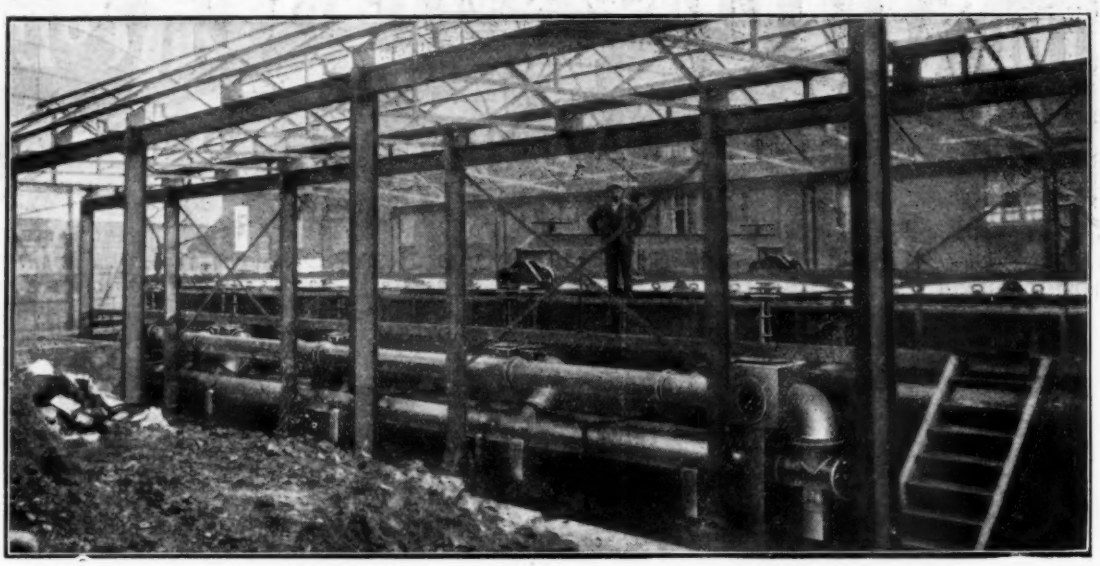

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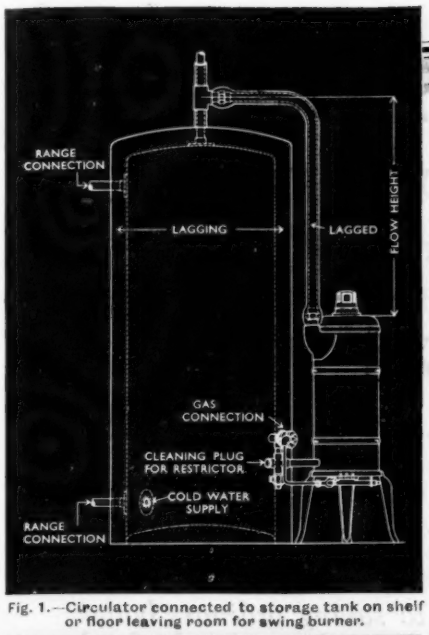


Fig. 1.—Circulator connected to storage tank on shelf or floor leaving room for swing burner.

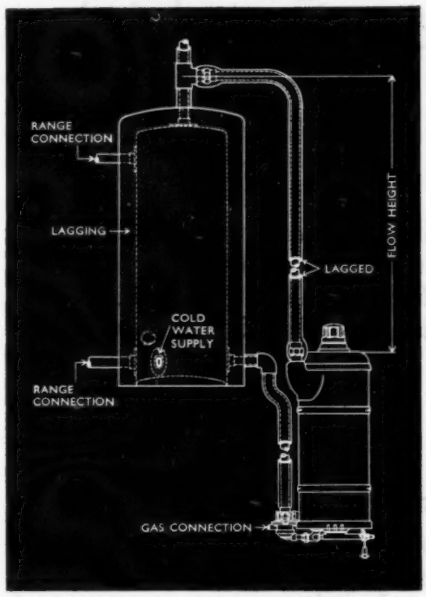
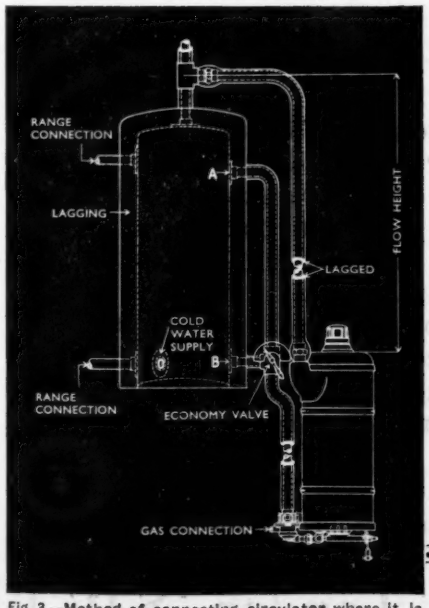


Fig. 2.—Method of connecting circulator where it is desirable to have unit below storage tank.



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The STANTON Mechanical Lead Joint

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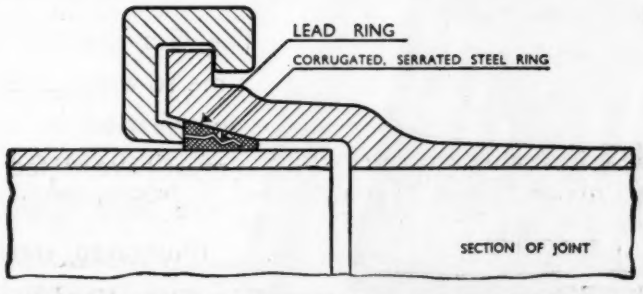

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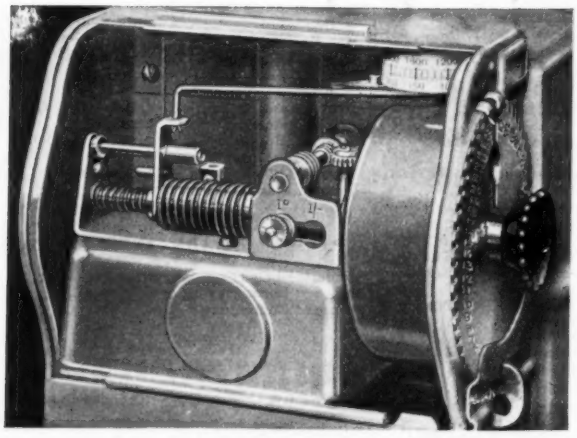

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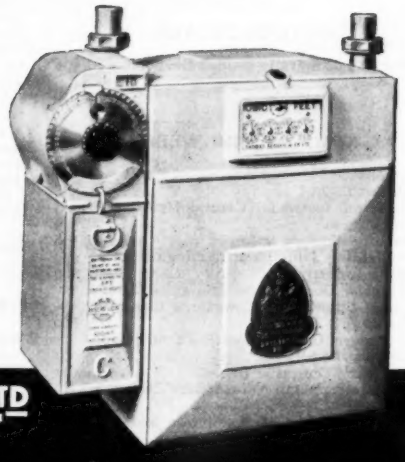

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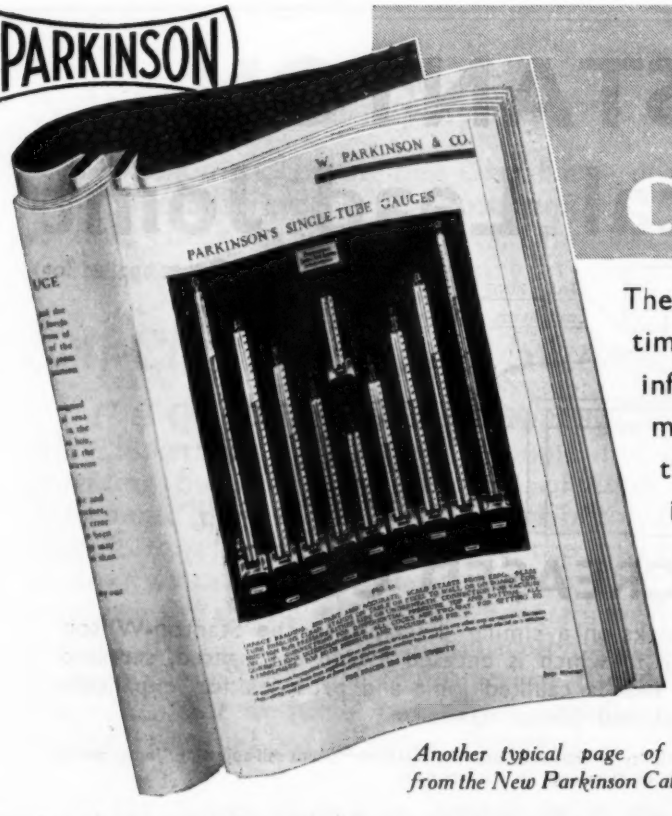

Another typical page of gauges from the New Parkinson Catalogue.

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The Gas Engineer to-day has little time to waste when seeking data and information as to appliances. He must have his facts handy. Here is the ideal catalogue, simple, well illustrated, straight to the point, easy to handle. Your copy awaits your request, post free, if you send a line on your business heading.

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THE GAS JOURNAL

MAY 31, 1933

Vol. 202. 85th Year No. 3654

A Glance at the Contents—

City and Guilds Examination Questions.

We publish to-day the questions which were set in the City and Guilds of London Institute Examinations for 1933 in Gas-Works Practice, Gas Supply Practice, and Gas Fitting. [p. 604.]

Wales and Monmouthshire Association

The Annual Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers was held at the Bush Hotel, Abertillery, on May 18, under the Presidency of Mr. Ifor G. Jenkins. [p. 617.]

Engineer and Manager Required.

A Staffordshire Urban District Council advertise for a Gas Engineer and Manager at a commencing salary of £450, rising to a maximum of £600. Applicants must be between 30 and 50 years of age. [p. 636.]

Sunderland Gas Company's Special Order.

The Sunderland Corporation carried to a House of Lords Select Committee its opposition to the Special Order promoted by Sunderland Gas Company, the purpose of which is to apply the basic price and dividend system to the Company. [p. 630.]

Design and Operation of Industrial Gas Appliances.

This was the subject of a paper read by Mr. E. A. Leask, of the Leeds Corporation Gas Department, at a meeting of the Manchester Association of Gas Engineers in Leeds on May 19, following an inspection of the Industrial Demonstration Rooms of the Leeds Gas Department. [p. 622.]

Leeds Industrial Gas Section.

In the course of the meeting of the Manchester District Association of Gas Engineers, held at Leeds on May 19, the members were enabled to make an inspection of the special Industrial Gas Section of the Leeds Gas Department—a section which of late years has been very greatly developed. [p. 615.]

N.G.C. Scottish Executive Board.

The Fourteenth Annual Meeting of the Scottish Executive Board of the National Gas Council was held in the North British Station Hotel, Edinburgh, on May 5. [p. 614.]

Manager and Secretary Required.

The Westbury Gas and Coke Company, Ltd., require the services of a fully qualified Manager and Secretary for an Undertaking having an annual output of about 30 millions. [p. 636.]

Cable Control Applied to Disc Gasholders.

Greater security and less cost are among the claims put forward by Mr. E. Lloyd Pease on behalf of a cable control system applied to disc gasholders. Some interesting diagrams illustrate his case. [p. 603.]

Parkinson Stove Company's New Showrooms.

Ultra-modern and very attractive in every respect are the Parkinson Stove Company's new showrooms in Terminal House, Grosvenor Gardens, S.W. 1, where a wide range of the firm's well-known gas appliances are tastefully displayed. [p. 609.]

North of England Auxiliary Association.

At a meeting of the North of England Gas Managers' Association (Auxiliary Section), held at Wallsend on May 27, Mr. J. B. Henderson, Distribution Superintendent, Wallsend, of the Newcastle-upon-Tyne and Gateshead Gas Company, delivered his Chairman's Address. [p. 625.]

Report of the Livesey Professor at Leeds.

Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C., Livesey Professor at the University of Leeds, has submitted his report for the session 1931-32 to the Chairman and members of the Livesey Advisory Committee on the work of the Department on Coal Gas and Fuel Industries (with Metallurgy). [p. 613.]

Forthcoming Engagements

June 12.—I.G.E.—Meeting of General Research Committee, 2.30 p.m.
June 13.—I.G.E.—Meeting of Gas Education Executive Committee, 4 p.m.
June 14.—ASSOCIATION OF STATUTORY INSPECTORS OF GAS METERS.—Annual Meeting in London.
June 15.—S.B.G.I.—Meeting of Council, 11.30 a.m.
June 15.—I.G.E.—Meeting of Refractory Materials Joint Sub-Committee, Stoke-on-Trent, 2.30 p.m.
June 15.—SOUTHERN ASSOCIATION (WESTERN DISTRICT).—Commercial Meeting at Exeter.
June 21.—B.C.G.A.—Meeting of the Executive Committee at 12 noon, 28, Grosvenor Gardens, S.W. 1.
June 23.—MANCHESTER DISTRICT ASSOCIATION.—Visit to the President's Works, Nottingham.
June 23.—WAVERLEY ASSOCIATION.—Annual Meeting in Edinburgh.
June 28.—I.G.E.—Board of Examiners; Oral Examinations, 9.30 a.m.
July 21.—MANCHESTER DISTRICT ASSOCIATION.—Visit to the Higginshaw Gas-Works, Oldham. Paper by Mr. Norman Hudson, Mirfield—"Observations on the Differential Charges of Gas for Distribution Purposes."
Sept. 7.—NORTH BRITISH ASSOCIATION.—Annual Meeting in Paisley.

1933 "JOURNAL" Directory.

Page 48. NELSON. G. R. Macfarlane appointed Engineer and Manager vice J. Mitchell.
Page 68. TIPTON. G. R. Macfarlane, Engineer and Manager, resigned.
Page 84. HAMILTON. J. B. Fernes appointed Engineer and Manager vice D. Robb retired.

EDITORIAL NOTES

Beacons of Hope

INSTITUTION week at Liverpool naturally focusses the attention of the Gas Industry on Lancashire. No part of our country has suffered more during these times of depression than the "Industrial North." Cotton, coal, and shipping have each been seriously affected. International forces—political and economic—have disorganized the smooth working of "the world's workshop." But Lancashire has not lost heart. In times of industrial depression there are two courses to take. There is the static course—to accept the position of declining trade as an inevitable factor which may or may not correct itself, pinning one's faith to trade cycles, and so on, with the probable result that some day one will wake up to find that conditions have changed and that the enfeebled industry is too far gone to reorganize. The second way to face industrial depression is the dynamic course—to examine the causes of the depression, to re-adjust weaknesses, to pursue new fields of work, and to prepare so as to be in the forefront of any turn in the tide of trade.

Lancashire, it seems to us, has a message which may well be taken to heart by the Gas Industry. She has given proof of her support of the dynamic course. Readers of the "JOURNAL" will have noticed during this month descriptions of two striking examples of modernization in Lancashire. We refer to the reconstruction of the Higginshaw Gas-Works of the Oldham Corporation and the new centralized coking plant of the Lancashire Steel Corporation at Irlam. Official recognition was paid to the importance of these two schemes in the fact that His Royal Highness Prince George inaugurated the two plants on May 8 and 9 respectively.

Thus Lancashire has lit two "beacons of hope" at a time when the world is in dire need of well-based encouragement. We use the term "well-based" advisedly. One of the most certain ways of attracting attention to an industry is to have faith enough in the future to spend money on modern equipment, to have sufficient knowledge to weigh up the advantages of such a scheme, and to prove in practice that one's calculations were correct and expenditure justified. A typical example of this is the recent publicity on the Southern Railway electrification schemes. The "man in the street" says "these are go-ahead people, and what is more they seem to know what they are doing." So it will be with the two Lancashire schemes which form the basis of these remarks.

At Oldham the first step is now complete of what is ultimately intended—namely, the centralization of all production of gas at the Higginshaw Works. In place of three manufacturing stations, there will be one. The layout of the new plant is on lines capable of economic extension, and embodies latest improvements in gas manufacture, which will have an immediate favourable influence on cost of gas production. In place of horizontal retorts with a daily output of $2\frac{3}{4}$ million c.ft., an installation of Woodall-Duckham continuous vertical retorts has been erected with a daily output of $4\frac{1}{4}$ million c.ft. Among the modern features to be found on the reconstructed works are step-grate producers for heating the settings using a mixture of coke and breeze, waste-heat boilers which recover in the form of steam the major portion of the heat in the waste gases, compound steam engines which generate power from high-pressure steam, provide low-pressure steam for steaming retorts, and so on, a complete coke screening plant to secure properly sized coke for market, and a benzole recovery plant. In short, Higginshaw is a credit to all concerned—and especially to Mr. F. Greenhalgh, Oldham's able Gas Engineer. Apart from reducing costs, the attention of the consumer will be drawn to the up-to-date source of supply.

Without cheap coke, cheap pig iron is impossible. Lancashire was faced with one of three alternatives—to operate old uneconomic ovens, to import coke from modern ovens elsewhere, or to provide a centralized modern coking plant. The last-named course was adopted, and following the grouping of interests in the formation of the Lancashire Steel Corporation a large modern plant was built and put into operation last autumn. The installation includes a battery of Becker ovens, coal handling, washing, blending, and crushing plant, and a complete bye-product and benzole recovery plant. No less than 5000 tons a week of coke can now be made, of quality controlled to suit the blast furnaces, with the low operation costs associated with modern ovens, and with conservation of the valuable bye-products. This new centralized coking plant has already made a considerable contribution towards the reduction of the cost of steel production in Lancashire, and together with other economies which have been effected on the works has revealed the wisdom, and justified the courage, of those who decided to help themselves towards greater efficiency and economy.

In this dynamic attitude towards trade depression let the Gas Industry be the torch bearer for the nation, and show confidence as to the future by lighting further well-founded beacons.

Inside and Outside

IT was a good move which the Wales and Monmouthshire Association made last year when the decision was taken to admit as Associates commercial and technical men engaged in industries closely allied to the Gas Industry; and an interesting feature of the Association's meeting at Abertillery on May 18 was a paper from one "outside" the Industry. We quote the word outside, for it is in reality a misnomer as applied to the author of the paper, Mr. E. H. Clarry. For many years he was a full member of the Association, and for a long period he was actively engaged in the production and distribution of gas. For some years now he has been closely associated with the Gas Industry in another sphere, and has had the opportunity of visiting many gas undertakings, both large and small, and of regarding the problems of the Industry from a more detached point of view.

Consequently, what Mr. Clarry has to say is worth noting. His contribution, published on later pages of to-day's "JOURNAL," is clearly written and free from "padding." One thing which strikes him in his visits to works is the enthusiasm and keenness of those responsible for small undertakings as well as of those managing the larger works. This is a point we have often mentioned, but the fact remains that small undertakings necessarily operate at a disadvantage compared with their larger neighbours, and that either amalgamation or joint working must increase—as, indeed, it is increasing. The South-Eastern Gas Corporation, now owning seven undertakings and having an area of supply of 360 square miles, is an example. We need not stress the benefits of such co-ordination by way of raising capital, buying new materials, establishing a more lucrative market for bye-products, and cheapening the cost of the therm into the holder.

Mr. Clarry confines his attention to distribution and sales; and it is in this direction more than in any other that amalgamation or joint working will prove most useful. Amalgamation implies greater concentration. Large-scale manufacture is in the hands of specialists, distribution again is in the hands of specialists, and the same applies to the selling of gas to both home and factory. Properly carried out it means greater service to the consumer—steadier pressures in the mains, a general levelling of calorific value, the supply of a gaseous fuel of uniform quality. In fact, the very things which Mr. Clarry rightly regards as essential to the progress of the Industry in a welter of competition. The

author would like to see established a standard calorific value for Great Britain, and as an argument in favour states that the peripatetic cook or housemaid never gets full efficiency in the use of gas, because of the different conditions which obtain in various areas. We think this is not so serious as the author suggests. A properly adjusted hotplate is just as good on 450 B.Th.U. gas as it is on 500, and, as for the oven, thermostatic control is not dependent on the calorific value of the gas.

What we like best about Mr. Clarry's paper is his insistence that people do not buy gas. They purchase light and heat—service. The future of the gas business rests upon recognition of this fact, and everything should be done to ensure that appliances in use should give their full efficiency. In this connection Mr. Clarry says: "If for a small quarterly charge (or preferably for no charge at all) the customer could be regularly visited—say, every three months—and his fittings cleaned and adjusted . . . more use would be made of the appliances." It was appropriate that at the same meeting of the Wales Association, the President, Mr. I. G. Jenkins, should have referred to the plan he has adopted to clean and overhaul cookers without payment, cleaning and repair shops having been erected for this purpose at the Abertillery Gas-Works.

The Tenants' Charter

THE Parliamentary debate on the Bills of the Gas Light and Coke Company and the Commercial Gas Company, which preceded the third reading in the House of Commons, was an interesting one, and useful for the sane arguments it elicited in favour of freedom of Council House tenants from dictation in the matter of the form of light, heat, and power that they should use. One of the speakers was the Marquess of Hartington, who was Chairman of the Select Committee who considered the Gas Light and Coke Company's Bill, and he well stated the case for the Bills in the following sentences: "There is no question here of the rival merits of gas or electricity. People sometimes prefer the one and sometimes the other. I believe that the majority of householders prefer electricity for lighting purposes and gas for cooking and heating, because it is cheaper. There are some who prefer gas for all purposes. What seemed reasonable to the Committee was that people should have what they wanted. There have been cases where housing authorities have used their powers in a most arbitrary way. I wonder whether hon. members are prepared to defend the action of a Borough Council which, in order to push the sale of its own electricity, filled with cement the gas pipes in the Council Houses? That has really happened. In another case gas fixtures were forcibly removed from Council Houses. Then there was the case of a gas company which offered to lay pipes to an estate, but the Housing Committee of the Corporation wrote: 'As you know, the Corporation has its own electricity undertaking, and therefore does not propose to install gas in the new flats.' That is not a proper use of the powers of a Local Authority."

Mr. Will Thorne pointed out that the principle for which the Gas Light and Coke Company and the Commercial Gas Company were asking has been conceded on two occasions. The first time that the House conceded the right now sought was to the Newport Corporation in 1925. Later came the case of the Kettering Local Authority, when the right to impose certain conditions upon tenants was taken away. Here are the views of Mr. Briant: "During the summer working-class families have to eat food just the same as at other times, and everyone knows that electricity for heating purposes is a great deal more expensive than gas. It only means that these poor persons will not use electricity, because it is too dear. They will light a fire; and that means that a fire is going all through the hot summer day, from morning until night, and I have been in homes where, on a hot summer day, people have to live in a steamy and hot atmosphere. . . . I am not going to flatter the gas companies, but I know of no organization which treats its men so well, or which is so well organized."

Later in the debate, Mr. Wise, who was a member of the Select Committee, declared that "the main principle which determined the decision of the Committee was that in our opinion this Bill secured liberty of choice for the subject and economy for a class who particularly needed it. . . . If you subsidize houses in order to reduce the rent which people would otherwise have to pay, it is surely very illogical to debar them from the right of selecting a more economical form of light or heat in the same house. It would, in fact, only be giving away with one hand what you had given them with the other. A large number of witnesses were called before the Committee to testify on this one question, and the overwhelming weight of evidence was definitely on the side that it was less expensive to do your cooking with gas than with electricity, and that it was less expensive to have your house lighted with gas than with electricity."

As was reported in last week's issue of the "JOURNAL," both the Gas Light and Coke and the Commercial Bills were read a third time, and passed.

The Two-Part Domestic Tariff

DURING the meeting of the Wales and Monmouthshire Association, some remarks were made by Mr. J. H. Canning upon the subject of the block system of charge and the two-part tariff. Mr. Canning commented upon the extreme simplicity of the block system, but at the same time he pointed out that any misapprehensions regarding the two-part tariff should be removed on reflection that this is precisely the method upon which telephone charges are levied—and by this time most people are familiar with the telephone service. This aspect is also referred to by Mr. D. J. Bolton, who, in an article on the two-part domestic tariff, in the current issue of the *Electrical Review*, remarks that the two-part rateable value tariff is a combination of precisely those two tariffs with which the householder is already fully acquainted—viz., for water and for gas, which he pays for by a rateable value levy and by a flat rate per unit of consumption. Combine the two, and the two-part tariff emerges. Though many electricity authorities now have some such tariff as an alternative, Mr. Bolton realizes that by no means all of them push it as much as they might, and a great deal still remains to be done in persuading the public to accept and welcome it, "many consumers," he says, "through sheer misunderstanding, still cling to a flat rate and restrict both their amount and range of consumption, with loss of revenue to the undertaking and of services to themselves. Such an attitude would not persist if the position were reasonably presented, and the facts of the situation adequately portrayed." Mr. Bolton's article, while referring primarily to electricity, marks the importance to the Gas Industry of greater freedom in the matter of tariffs.

And speaking of electricity, we notice a statement in the Press that for the first time since the beginning of the present trade depression, the Electricity Commissioners' monthly returns record a lower output than for the same month of the preceding year. That is to say, the decreased output for April is 3·6%. There may be several reasons for this—Easter not being a fixed date frequently upsets statistics—but probably there will be disappointment that the decreased output should be recorded just when some observers are recording a perceptible lifting of the clouds of industrial depression.

To Our Subscribers.

Consequent upon the intervention of the Whitsun Holiday, our Second Institution Number of the "JOURNAL" (which will contain the review of the proceedings at the Meeting, together with a full report of the discussions on the papers) will be published on Thursday, June 8, instead of on the Wednesday as usual.

CORRESPONDENCE

Construction of Spirally-Guided Gasholders

SIR,—It is not surprising to find that contributors to the Technical Press prefer to use similar formulæ to that I deduced for the maximum pressure on axles of spirally-guided gasholders, rather than adopt equations produced by Mr. Gadd. There is every justification for estimating the maximum axle pressures from formula that satisfies the following conditions:

(*a*) Correct deduction from clearly defined principles.
(*b*) Response to simple algebraic tests.
(*c*) Consistence of results with practical experience.

Now Mr. Gadd's erroneous equations for maximum axle pressures do not comply with any of the above conditions and it is probably due to this fact that his articles have evoked so much criticism from various sources. In my final criticism of Mr. Gadd's formula, which appeared in the "JOURNAL" dated Aug. 31, 1932, I showed that his equations had not been correctly deduced and, in consequence, would not respond to a simple algebraic test.

The formula I deduced allows for contact and consequent resistance being offered to the overturning moment by all the guide rails on the floating lift, and not those on one side of the holder only, as suggested by Mr. Gadd. Fig. 15 on page 307 of the "JOURNAL" dated Feb. 10, 1932, illustrates this feature, and Mr. Gadd will observe that the displacements at each point of contact of the guide rails with the rollers are indicated by localized vectors.

The principle of least work applied to the problem has certainly possibilities, but even in this case assumptions will require to be made upon which the accuracy of the result will ultimately depend.

Another and more powerful method of investigating the pressure on roller axles is from the co-ordination of experimental observations. While both methods present certain difficulties there are, however, some channels open to development, and research work in this direction is already in progress. Nevertheless, until further information is available, it is certain that the existing methods of investigation must receive due consideration in the case of gasholder design, just as they do in the design of bridges and other important steel structures.

Yours, &c.,
S. M. MILBOURNE.

31, *Warren Road*,
Cricklewood, N.W. 2.
May 29, 1933.

SIR,—I have read with interest the letter from Mr. Gadd in your issue of May 17.

I express no regret for referring to the formula given by Mr. S. M. Milbourne in his article headed "Spiral Gasholders" published in the "JOURNAL," Feb. 10, 1932, this being given by me as an alternative method of determining the loads on the roller carriages due to wind pressure.

If, as Mr. Gadd now suggests, this formula contains a geometrical error, it is rather surprising to note that his effort to point this out has been so long delayed.

His assertion that Mr. Milbourne contends that roller contact takes place on one side of the holder only is certainly a misrepresentation, and it is regrettable that such a misleading statement should have been included in his letter.

In conclusion, may I be allowed to point out that it was a formula proposed by Mr. Gadd, which was subjected to some criticism in the "Correspondence" column a short time ago, and not the one mentioned above, as his latest contribution seems to suggest.

Yours, &c.,
W. T. HOBSON.

Wolverhampton,
May 27, 1933.

THE NEWS OF THE WEEK

A Reduction in the Price of Gas has been announced by the Newton-in-Makerfield Urban District Council from 10d. to 9·06d. per therm.

The Colonial Gas Association, Ltd., announce that the address of their London Office has been changed to 15, Victoria Street, Westminster, S.W. 1.

The Royal Sanitary Institute will hold their Forty-Fourth Congress at Blackpool from June 17 to 24 next, when a full programme of technical and social activities has been arranged.

From the Cromer Gas Company we have received a copy of the Official Guide to Cromer and District, published by the Cromer Advertising Association, under the auspices of the Urban District Council.

Southern Association (Western District).—The next commercial meeting of the Southern Association of Gas Engineers and Managers (Western District) will be held at the offices of the Exeter Gas Light Company, 11 and 12, Southernhay, Exeter, on Thursday, June 15, at 2.30 p.m.

Twenty-Seven Local Authorities, meeting at Newcastle-on-Tyne on May 26, at the suggestion of the National Smoke Abatement Society, decided to form a Joint Regional Advisory Committee. The purpose of this Committee, as outlined by Mr. Arnold Marsh, Secretary of the National Smoke Abatement Society, is to secure greater uniformity in the administration of the law relating to the emission of smoke, to standardize methods of taking observations, to organize training courses for stokers and boiler attendants, and to bring about a better understanding between local authorities and manufacturers. Similar Committees, said Mr. Marsh, were already working successfully in the Midlands, the West Riding of Yorkshire, and Manchester.

Over Five Thousand People of Oldham and district accepted the invitation of the Gas Committee to inspect the reconstructed gas-works at Higginshaw on the four days following the opening by Prince George. They were shown round, and the working of the various plant was explained to them by two of the staff. A collecting box at the entrance for the Oldham Royal Infirmary and the League of Service yielded £18.

British Gas Light Company.

The British Gas Light Company, stated the *Financial Times* in a recent "Potential Investments" column, was established in 1824 and registered in 1857. By virtue of continuity of management, the maintenance of the highest trading tradition, and by a steady expansion of interests and intensive research work, the undertaking rests on strong foundations. The number of consumers increases each year, and, despite the prevailing depression, revenues have been well maintained. The Company plays an important part in the domestic and industrial economy of the country, and there is every reason for the investor to regard its future as promising.

The Company owns Gas Undertakings at Holywell, Hull, Norwich, Trowbridge, and elsewhere, and controls numerous gas and other utility concerns, including the Bradford-on-Avon, Cromer, and King's Lynn Gas Companies, the Swanage Gas and Electricity Company, and the Flint Gas and Water Company. The system now comprises altogether 30 gas, one electricity, one water undertaking, and chemical works.

Since 1923 the ordinary dividend has been maintained at 7½%, last year's earnings showing a margin of over 2%.

Net profit is struck after satisfying debenture and loan

PERSONAL

Sir RICHARD NEEDHAM has, we understand, joined the Board of the Alliance and Dublin Consumers' Gas Company.

* * *

Resulting from the death of Mr. T. SANDERSON, who was long associated with Messrs. Sidney Flavel & Co., Ltd., stove makers, of Leamington, as reported in our issue of last week, we learn that the following appointments have been made. Additional Directors: Miss I. LANE and Mr. S. W. B. FLAVEL, B.Sc.; Mr. G. WESTLEY to be Secretary and Accountant; Mr. BURTON-SMITH to be Assistant Secretary and Cashier. These appointments are very popular as they are all promotions in the existing staff. Miss I. Lane has been associated with the Company for fourteen years, and has been Private Secretary and chief of office administration. Mr. S. W. B. Flavel is the sixth generation of this old-established private family business, his uncle, Mr. Percival Flavel, J.P., being the present proprietor.

* * *

Mr. JOHN MONKS, Assistant Gas Engineer to the Wigan Corporation, is recommended for the position of Gas Engineer and Manager in succession to Mr. FRED BETLEY, who is retiring after twenty-one years in the post. Mr. Monks was selected out of a short list of three. The post has a salary of £700, rising by annual increments of £50 to £850 a year. Mr. Monks is 44 years of age, and as a young man served for three years as an articled pupil under Mr. Timmins, M.Inst.C.E. (Gas Engineer at Wigan), and in 1912 he was appointed Chief Assistant under Mr. F. Betley.

* * *

The inquiry for an Engineer and Manager for the Tipton Urban District Council Gas Department, advertised on another page of this issue, is the result of a vacancy caused by the resignation of Mr. G. R. MACFARLANE, who leaves in order to take up a similar appointment with the Nelson Corporation Gas Department. Mr. Macfarlane has been Engineer and Manager at Tipton since September, 1926.

* * *

The marriage took place on May 25 of Mr. CHARLES F. BLINCOE, Engineer and Manager to the Middlesbrough Gas Department, to Miss Frances Christiana Sedgewick, of Stockton.

OBITUARY

The death has occurred of Mrs. Margaret Chew, aged 76, widow of Mr. Wm. Chew, formerly Blackpool's Gas Manager, and mother of Mr. J. H. Chew, who succeeded his father in that position.

THE NEWS—continued.

interest, Hull reserve fund allocations and income-tax, and includes only the profits of the subsidiaries distributed as dividends.

The interim dividend of 3% is usually paid in early October. In April, 1932, £350,000 of 5½% redeemable cumulative preference shares were issued and subsequently converted into stock. The 4% debenture stock is redeemable at par at any time on three months' notice, and the 5% at par Dec. 31, 1951. There are also mortgage debentures for various amounts, totalling £422,417, and bearing varying rates of interest, specifically secured on the Hull, Norwich, and Trowbridge undertakings.

Gas Preferred to Oil for Central Heating in Southampton.

The Southampton Gaslight and Coke Company are sparing no effort in attempting to capture the important central heating load for gas, and they are meeting with signal success.

An order has recently been obtained from Messrs. Handy, Ltd., the well-known motor engineers, for the heating of their extensive new premises and the unit chosen consists of two No. 2 G.B.7 "Ideal" boilers having an output of 540,000 B.Th.U. per hour and supplying 3600 sq.ft. of direct radiation.

Competition from oil was very keen, but a careful appreciation of the advantages of gas turned the balance in its favour.

Satisfactory Working at Leeds.

Major Geoffrey Kitson, presiding at a meeting of the Leeds Corporation Gas Committee on May 22, reported that during the financial year ended in March, there had been a saving in actual cost of manufacture at the works of no less than £18,839.

The total net profit for the year has been £4627, made up of profit on the working of the Department £1963 and income-tax surplus in respect of preceding years £2664. This net profit has been arrived at after providing £15,668 for income-tax, £4696 for bank interest, £144,669 for loan charges and interest, and £10,260 for contributions to capital.

Buildings and plant have been maintained out of revenue as well as a new coke-screening plant at Meadow Lane Works, and a new telpher for the conveyance of coke at New Wortley Works purchased, the total cost of these two items being £3000.

The Department have had an increase in revenue from tar of £5800, and the benzole plant at New Wortley showed an increased profit of nearly £1000. On capital account the net debt has decreased during the year by £106,000.

CONFIDENT OUTLOOK.

Major Kitson took the opportunity of commenting on these salient features of the report, pointing out that in these times of bad trade the Department expect a falling off in orders for gas, and when with trade depression there is coupled very mild weather which has obtained throughout the last twelve months, with the exception of one cold spell, it is bound to lead to decreased output.

The Department can look forward with a feeling of confidence. In the first place within twelve months there will be a decreased charge on account of loan charges and interest of more than £70,000, which will recur annually, and there is evidence that manufacturers are turning to the possibility of using gas-fired furnaces for many business requirements.

The Department's load for central heating is gradually increasing owing to the special rates which they are now empowered to quote for this class of business.

Street Lighting Triumph at Lymington.

That they have succeeded in converting the street lighting to gas after no fewer than thirty-two years of electrical lighting is the praiseworthy achievement of the Lymington Gas and Coke Company; and Mr. J. W. Gibson, A.M.I.Mech.E., the Engineer, Manager, and Secretary of the Company, sends us the following interesting notes relative to the conversion.

In the first instance, writes Mr. Gibson, as the Electricity Undertaking had carried out the public lighting for thirty-two years, and probably considered that they had security of tenure, it was necessary for the Gas Company to convince the Local Authorities that they could provide a more efficient and economical service. The opportunity occurred last year when the Corporation, in enlarging the Borough, called for tenders for the provision, erection, lighting, and maintenance of twenty-two street lamps in the Pennington District. Both Gas and Electrical Undertakings were given the opportunity of submitting tenders, and the Gas Company did not attempt any price cutting in their effort to secure the contract, but offered a price which would cover all contingencies and still afford a small profit on the scheme.

In submitting their tender for this new district, the Electrical Undertaking also quoted for the lighting of the original Borough of Lymington, the contract for which expired at the end of March. By a little propaganda, however, it was pointed out to the Council that the Gas Company should have the opportunity of submitting a tender for this contract also, and the tenders for the new district were referred back to the Lighting Committee in order that the Gas Company might re-tender on the lines of the electrical tender.

Fresh tenders were therefore submitted, and, in the meantime, Mr. Gibson, in conjunction with the Bournemouth Gas and Water Company, by the courtesy of Mr. P. G. G. Moon, the Engineer and General Manager, arranged for an advertisement to appear in the local Press on similar lines to those adopted by the Gas Light and Coke Company in connection with their recent public lighting contract for the next fifteen years in Westminster. A copy of the newspaper containing this advertisement was

THE NEWS—*continued.*

sent to each member of the Corporation, emphasizing that a conversion from electricity to gas for public lighting was by no means a retrograde step. The result was that the Lymington Gas and Coke Company were successful in securing the contract for the street lighting of the Borough for the next seven years.

THE CONVERSION.

The work of erecting the twenty-two new lamps in the extended part of the Borough was put in hand at the beginning of last September. Special pains (continues Mr. Gibson) were taken to ensure an adequate supply of gas to the lamps in the new district, as the area is growing rapidly. It was thought advisable, therefore, to lay mains throughout the district, and 1740 yards of main were accordingly laid, the whole scheme being concluded in the course of one month. The Gas Company made a special point of employing local labour, thus assisting the local unemployment problem, with the result that when they commenced work on the conversion of the electrical lamps the public were convinced of the efficiency of gas for street lighting.

The work of converting 196 lamps in the Borough, due to be lighted on April 1, presented difficulties by reason of the fact that the Electrical Undertaking were apparently not at all anxious to afford the Gas Company access to the lamps in question. As it was necessary to lay new service pipes, the Corporation were approached, which had the desired effect, and the first lamp to be converted (on March 1) was on a column in the centre of the town, on the base of which was a tablet stating that gas was first supplied in Lymington in September, 1832. This had been considered a desecration, and the electric lamp was therefore removed at the earliest possible moment, and a 6-light " Rochester " gas lamp erected in its place.

The conversion of the Navigation Lights at the mouth of the Solent also presented some difficulties. These lights are a guide to shipping entering the harbour, and careful attention had to be given to the correct focussing of the lights, which, in normal circumstances, have to be visible six miles distant. The problem was solved by employing the lenses of navigation lights taken from the S.Y. " Fortuna," now out of commission and adapting them in conjunction with 2-light " Rochester " lamps. By arranging the mantles to come in line exactly with the centre of the lenses success was achieved, and the lights are now discernible from the Isle of Wight.

Another conversion which presented some difficulties was the lighting of the face of the public clock, access to which would not be allowed by the Churchwardens, on the grounds of alleged danger to the interior woodwork from the heat of the lamps. This problem, however, was solved by the floodlighting of the clock.

As the Gas Company are particularly anxious that there shall be no failures in the street lamps, they are experimenting with the use of the " Certlyte " by-pass (manufactured by the Solent Engineering Company, Ltd., of 71, High Street, Southampton), and from their experience are gradually adopting this mechanism throughout the whole district. No single case of failure has yet been reported in lamps where this by-pass has been adopted.

Mr. Gibson states in conclusion that the Company have by this contract secured a fine advertisement for gas, and general appreciation is being expressed on all sides in regard to the better lighting of the town.

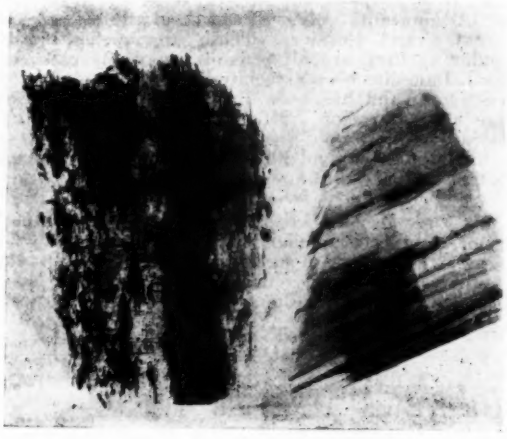
X-Rays in Industry.

During the past few years considerable headway has been made in connection with the application of X-rays to industry. Among engineers in particular the subject has come into great prominence, more so perhaps since the Boiler Code Committee of the American Society of Mechanical Engineers specified X-ray inspection for welded boilers. It seems to be generally recognized that for the examination of welds and fabricated structures, X-rays have a definite sphere of usefulness.

In foundry practice, too, X-ray inspection has frequently proved its worth in the development of experimental castings which may ultimately be standardized. In many instances, X-rays give the only clue to an inherent flaw which a slight modification in the design of the casting would ultimately remove. In the construction of high speed engines, as in the case of aircraft, for instance, where the weight-power ratio has to be closely watched, radiographic inspection of vital components is definitely indicated.

With modern apparatus and technique some striking results can be achieved. A widespread impression that the apparatus for industrial X-ray examination is very costly and requires skilled personnel for its operation is, perhaps, one of the reasons why X-ray inspection has not been more generally adopted.

An Industrial X-ray Laboratory is now in existence which undertakes the radiographic examination of customers' specimens, assembled articles, and components for almost every class of industry. In the case of examinations of such articles as castings, welded boilers, and pressure vessels, &c., which would be difficult to transport, special mobile equipment is available which permits of the job being handled on site.



Radiographs of Coal for the Determination of Ash Content.

The specimen on the left shows a large proportion of incombustible matter

Philips Industrial (X-ray Division), 145, Charing Cross Road, London, W.C. 2, who are responsible for the innovation, inform us that the need for such a service was brought home to them forcibly by many engineers who were faced with problems in which X-rays offered a definite solution but were not in themselves sufficient to warrant the purchase of special equipment.

Sir Francis Goodenough Addresses International Chamber of Commerce Congress in Vienna.

In opening the First Plenary Session of the International Chamber of Commerce Congress in Vienna on Monday, Sir Francis Goodenough, C.B.E., Chairman of the International Distribution Commission, referred to the immense and fundamental importance of distribution; it had been realized, at the previous Congress two years ago in Washington, that failure to devote as much inquiry, thought, and progressive action to the problem of distribution, as had been devoted to the problems of production and finance, was one of the leading factors contributing to the world's existing economic troubles. Nothing that had occurred in the two years, since passed, had reduced the relative importance of distribution. On the contrary, the study and solution of the problems of distribution were more urgently called for to-day than ever before.

" Our task has," said Sir Francis, " two aspects, the immediate and the future; and I want particularly to stress to-day the need for immediate action if we are to be of any value in helping the world out of the economic morass in which it is floundering. The important point is to get action taken that will produce results at an early date—that is, in the near future and not some years hence, when the present era of trade depression, I believe, will be no more than an ugly memory. We should then be too late to play—as we ought to play—a useful part in bringing into being the era of unprecedented prosperity, and of improved conditions of living for all the peoples of the earth, which I believe can be established through co-operative action and whole-hearted goodwill on the part of the intelligent leaders of commerce throughout the civilized world.

" The collection of data by various National Distribution Committees and its co-ordination and publication by the Central Distribution Commission will be of great value in due course; though I ought to remark here that, for the satisfactory and continuing conduct of the work involved, adequate finance will be essential—and in the term ' satisfactory conduct ' I include particularly expedition in preparation, collection, and publication, for stale statistics and

out-of-date information are worse than useless; they are liable to be very misleading.

"But be the National Committee ever so efficient and expeditious, they cannot possibly produce results of value in the present crisis, unless they take steps to collect and publish quickly all the suggestions that traders in the various countries can put forward, based upon their experience, for the improvement and cheapening of the processes of distribution. I hope that this Congress will send a message to all the National Committees asking, as a matter of urgency, for such suggestions, and for all the information bearing on the subject that can be put at once into the common pool.

"There is another message which I should like to send to every trader in every country, and it is this. Do not rely for your prosperity, or your progress, or your salvation, upon any Chamber of Commerce, international, national, or local. Make the fullest use of the help they can give you, but do your own thinking and your own work for yourself to the utmost of your capacity, power, and courage. Employ on the commercial side the best character and brains that money can buy; recruit from among the soundly educated; give them attractive prospects; and then educate and train them for the skilful conduct of your business. Thus can you contribute your share to the good of the world as a whole, for the efficiency of every nation is the sum of the efficiency of its citizens; and the prosperity of the world is the sum of the prosperity of the nations."

South-Eastern Gas Corporation's Offer for Sittingbourne Shares.

The South-Eastern Gas Corporation announces that it has made an offer to the shareholders of the Sittingbourne District Gas Company to purchase their shares on the following terms:

For each £20 original ordinary (10% max.) share either £28 in cash or 22 ordinary shares of £1 each, fully paid, of the Corporation.

For each £20 additional ordinary (7% max.) share either £19 12s. in cash or 15 2-5 ordinary shares of £1 each, fully paid, of the Corporation.

The offer is open until June 12, and will become effective if acceptances are received in respect of shares to the extent of not less than 55% of the capital of the Sittingbourne District Gas Company.

Record Year's Output at Belfast.

A net profit of £85,289 was made by the Belfast Corporation Gas Undertaking for the year ended March 31 last. The Department's make of gas, compared with the previous year, shows an increase of more than 97 million c.ft., surpassing the previous record by 21,370,000 c.ft. A gross profit of £136,282 was made. This is an increase of £13,033 as compared with the previous year. The net profit was £85,289, and after allocation to various funds, &c., the balance carried forward to the credit of the appropriation account is £29,792.

"We have been lately making special efforts to increase our domestic load for such purposes as water heating, garage heating, cooking, and general heating purposes by gas fires, and it is to these efforts that the increase has to be attributed," says Mr. J. D. Smith, Engineer and Manager, in his annual report. "In the manufacture of water gas we used 2,250,269 gallons of gas oil, as compared with 2,134,991. The duty of 1d. per gallon which was recently imposed upon oils of this class will impose an additional burden of approximately £10,000 per annum, equal to nearly 2d. per 1000 c.ft. of water gas, without giving any appreciable benefit in other directions.

"In the manufacture of coal gas we used 170,187 tons of coal—2317 more than last year, and from each ton we were able to produce 17,901 c.ft. of gas compared with 17,808 c.ft. last year—a record. Such a result can only be produced in plant which is kept thoroughly up-to-date. By taking advantage of market conditions last summer we were able to enter into contracts for coal at exceptionally low rates, the average cost being approximately 10d. per ton lower."

Residuals.

Sale of coke exceeded the previous year's figure by 7000 tons. The balance from the chemical department amounted to £54,211—an increase of £4400. The tar products revenue totalled £52,944—an increase of £4835. The bulk of the tar was prepared to Road Board specifications and was in great demand. Unlike most of the foreign-produced materials in use it rendered the roads as nearly skid-proof as was possible under all conditions of weather, at the same time standing up to modern traffic conditions as well as any material. A contract has been made with the Down County Council to supply 1¾ million gallons of road tar during the present year, and the remainder of the supplies had been taken up by the other local county councils. The whole output was, therefore, sold until the end of March, 1934. No fewer than 60 different preparations of which tar was the basis were manufactured, and collectively they were responsible for a considerable proportion of the revenue under this heading.

The Committee placed on record their appreciation of the excellent result secured in the Undertaking during the year notwithstanding the acute trade depression. They also expressed appreciation of the very efficient manner in which the Manager and his staff carried on the Undertaking.

Fire at Metropolitan Gas Meters' London Works.

What might have proved a disastrous fire broke out early in the morning of Wednesday, May 24, at the Walworth Works of Messrs. Metropolitan Gas Meters, Ltd., in Catesby Street. Thanks, however, to the prompt work of the Fire Brigade, who quickly had a hundred men on the scene, the outbreak was confined to a small portion of the stores, and the production departments were untouched.

The consequences were therefore much less serious than might have been expected. In fact, not an hour of actual productive work has been lost, although a dozen fire engines were called up, and about thirty families living near had to leave their homes while the fire was at its height.

Gas companies having meters and accessories on order from Metropolitan Gas Meters, Ltd., have therefore no reason to fear delay as regards deliveries. All destroyed stores have already been replaced from the Company's Nottingham Headquarters, and orders are being despatched strictly to time.

Rotherham Holds Gas Exhibition and Demonstrations.

Under the auspices of the Gas Department of the Rotherham Corporation, an exhibition with cookery demonstrations was held in the Town Hall Assembly Rooms from May 15 to 19 last.

Alderman R. Kirk (Chairman of the Gas Committee) presided at a luncheon held in the Town Hall prior to the opening ceremony, and among others present were Mr. George Baker, O.B.E., President of the Rotherham Chamber of Commerce; Mr. J. W. Muntus, President of the Rotherham and District Chamber of Trade; Aldermen and Councillors of the Borough; Mr. J. T. Haynes (Engineer and General Manager of the Gas Department); and Mr. J. W. Holroyd (Distribution Superintendent).

Alderman Kirk, who presided at the formal opening ceremony, said Mr. J. T. Haynes had been very energetic and enterprising in regard to the Exhibition and the reduction of the price of gas to consumers. The aim of the Exhibition was to cheapen gas and to show how it could be used with advantage for domestic purposes and the resultant cleanliness. The two-part tariff system in use in Rotherham had been copied by various towns throughout the country. The consumption of gas in ten trial houses had increased by 14 times, and the average figure had worked out at 1s. 3d. per 1000 c.ft. instead of 3s. A profit had been made by the Gas Department in addition to encouraging the consumption of gas.

Alderman Caine congratulated the Gas Department on the enterprise shown not merely in organizing that Exhibition of cookery and gas appliances, but also in pushing forward the many uses of gas during the past few years. For a good many years he had been one of the keenest critics of the Gas Department, and in the past he had taken the opportunity of upbraiding them for their lack of enterprise. He did not think the fault was altogether with the Gas Undertaking because the Gas Industry generally until a few years ago was somewhat lacking in enterprise in comparison with the Electricity Department and the electrical industry throughout the country. The Rotherham Corporation were, of course, added Alderman Caine, the owners of both gas and electricity undertakings.

Many persons preferred to regard them as competitors, and they wondered how the Corporation managed to run two competitive undertakings. In actual practice, however, they were not competitors, and they were complementary to one another. In Rotherham they had been success-

THE NEWS—*continued.*

ful in striking the happy medium by which both Departments had a clear field in their own particular sphere.

ALLOCATION OF PROFITS.

From the profits of the Gas Department, continued Alderman Caine, £200,000 had been used in the relief of rates, and for 20 years out of the 27 years he had been a member of the Corporation he had made an annual speech against that policy. It would not be very complimentary to him that day if the Gas Department intended to pursue that policy. Had the £200,000 been used for the purpose of the reduction of capital charges and the price of gas to the consumers there would have been a greater sale of gas to-day. Since the abolition of the old policy and the introduction of one putting back the profits into the Undertaking and giving consumers the benefit of that action, the Gas Department had gone ahead by leaps and bounds. The Gas Department did not manufacture gas in their own works. Fifteen years ago they commenced to use coke oven gas, and since the year 1928 they had relied entirely upon it. During the past five years the Gas Department had almost trebled its output, which was very satisfactory progress. During the past two years, in spite of the fact that the country and industry generally had been passing through the most severe depression ever known, the output of the Department had increased by nearly 25%, and the number of regular employees had also increased by 25%, excluding those taken over in the recent purchase of the Conisbro' Gas Undertaking.

During the course of the Exhibition interesting and instructive cookery demonstrations were given by Miss E. Sanderson, first class diplomée, N.T.S.C., of Radiation, Ltd. Washing machine demonstrations were given twice daily by the Economic Gas Boiler Company, Ltd., while there was an interesting display of gas lighting fittings by Messrs. George Bray & Sons, Ltd.

A cake-baking competition was also held, and Mr. Haynes presided at a pleasing little ceremony in which the Mayoress (Mrs. D. Bates) presented the prizes.

Gas Supply in Hull.

The City and Port of Hull is dealt with in an excellently produced and illustrated brochure published by the Hull Development Committee, with a view to attracting industrialists to establish their works on Humber-side at Britain's Third Port.

Among the advantages claimed for the City is, of course, a cheap and efficient gas service, which, states the brochure, is supplied by two Companies—viz., the British Gas Light Company, Ltd., which cover the area west of the River Hull, and the East Hull Gas Company, which supply the area east of the River Hull.

The British Gas Light Company, Ltd., supply gas in an area of nearly 20 sq. miles through more than 267 miles of main, the gas being at the price of 7d. per therm, with discounts up to 25% in the case of large consumers. In addition the Company supply an excellent smokeless solid fuel in graded gas coke, for domestic, garden, industrial, and business purposes. The Company are also tar distillers, and in addition to refined tars for road purposes, are producers of naphthas, light oil, creosote, and pitch. A wide range of up-to-date and thoroughly tested appliances is stocked for both domestic and industrial purposes.

The statutory area of supply of the East Hull Gas Company, continues the brochure, covers 50 sq. miles with 103 miles of mains. The price of gas is 7d. per therm within the City boundary, with discounts for large consumers.

Gas *v.* Electricity at Edmonton.

The Edmonton Urban District Council at their meeting on May 23 received a report from the Works, Highways, &c., Committee stating that they had again had before them particulars of quotations and schemes submitted by the North Metropolitan Electric Power Supply Company and the Tottenham and District Gas Company for improved lighting in Angel Road, the Light Railway Road, Bush Hill Park, and the Cambridge Arterial Road (referred to in the "JOURNAL" for April 12, p. 94).

In all, twelve schemes had been suggested, and the Council's Engineer had given details of what he considered to be the most suitable schemes submitted by each Company. Members of the Committee had inspected street lighting installations organized by the Companies. Gas lighting already existed in a considerable portion of the Cambridge Arterial Road, and having given the matter due consideration the Committee recommended the acceptance of the Gas Company's Scheme No. 1. For the lighting of Angel Road and the Light Railway Road they recommended the acceptance of the North Metropolitan Company's Schemes Nos. 2 and A(2) respectively. The voting in the Committee was 6 in favour of the recommendation and 3 against. In Angel Road, the Committee stated, there were two existing 300-watt electric lamps, and 18 additional 300-watt were proposed to be erected on weldless steel poles with a greater overhang than the existing poles, and a further 8 columns with 300-watt lamps on the parapet of the railway bridge, making 28 lamps in all. The lamps would be erected on one side of the road owing to the presence of the culvert on the north side. The 8 lamps to be erected on the bridge were of special design to harmonize with the structure of the bridge. The Company would require a 7-year contract for the lighting. The capital cost involved was £628, annual cost £201 12s.; number of lamps 26 new, 2 existing; total candle power 16,800.

The electricity scheme for the Light Railway Road provided for the suspension of lamps on the tramway poles, as in the Hertford Road. There would be two 200-watt lamps suspended on opposite sides of the road between each pair of tramway poles; one of each pair of lamps would be switched out at midnight. The Company would require a 7-year contract for the lighting. Capital cost £1045 4s., annual cost £410 19s.; number of lamps 96; total candle power 28,800.

The existing lighting of the Cambridge Arterial Road was by 6-lt. gas lamps which had been erected from time to time where houses were built and occupied, and the scheme was to complete the lighting of the road with 6-lt. lamps similar to the existing but fitted with the latest type of directional reflectors, providing for 74 additional lamps, making 101 in all. The Company would require a new 10-years' agreement. The capital cost involved was £925 (27 existing paid for, 74 proposed); annual cost £814 7s. 8d.; number of lamps 101; total candle power 60,600.

Councillor Dibbens moved the reference back to the Report. He had inspected the gas and electric lighting systems and read through the estimates, and he thought that the lighting of all three roads should be entrusted to the Gas Company. This would result in a reduction in cost of £2000 over ten years.

Councillor G. D. Euesden (Past-Chairman of the Council) seconded the reference back.

Councillor Preye (Chairman of the Committee) contended that the better course would be for the Council to decide the matter. The recommendation would probably come back again with the same majority.

Councillor Hollywood, supporting the motion, said that the roads in question were very important and the matter required the utmost consideration with a view to obtaining, if possible, a unanimous decision as to the most efficient and economical system of lighting.

The motion for reference back was carried.

Wallasey Gas and Water Department's Football Triumph.

On May 20 the Final of the Wallasey Municipal and Public Services Charity Football Competition was played at the Tower Grounds, New Brighton, when the Gas and Water Department were successful in winning the Cup—the J. Robertson Dunn Police Charity Trophy. This is the first year of the Football Competition, and the Gas and Water have worthily proved the senior service.

After the match the Cup and Medals were presented to the winners by Alderman Walter Eastwood, the Father of the Council and former Chairman of the Gas and Water Committee. A happy evening of celebration in the form of a Hot Pot Supper and musical smoker, with the Cup on the table, was attended by large numbers of members of the Social and Athletic Club of the Gas and Water Department, at the Queen's Royal Hotel, New Brighton.

The Chairman of the Gas and Water Committee—Councillor W. Holdsworth—congratulated the team on their success and expressed pleasure in again finding that gas, as always, was the leading service and had once again won the day.

The President of the Club—Mr. H. B. Holliday, Borough Gas and Water Engineer and Manager—received the Cup from the hand of the captain of the team, and expressed his pleasure and thanks to the team for their efforts and heartiest congratulations on their success. He had hoped that the Gas and Water Department would have had the opportunity of meeting the Electricity Department in this Football Competition so that it could have once again been proved, without any question, that gas was the better service.

Music and song completed an enjoyable evening, and arrangement are now being made to show the team's trophy—which was presented by Mr. J. Robertson Dunn, J.P.—in the windows of the three gas showrooms in the Borough.

Cable Control Applied to Disc Gasholders

By E. Lloyd Pease.

Rather more than forty years ago my method of gasholder control by steel cables was published. The system had a qualified success. The spiral guide system, coming out at the same time, was a formidable competitor. However, of the seventy holders in various parts of the world to which the cable system was applied, most, if not all, continued to operate with satisfaction.

In introducing a modification of cable guiding as applied to the disc style of gasholder construction, I am for a second time indebted to the pages of the "Gas Journal."

The control of the floating disc of the modern type of holder is a matter of the first practical importance. It is a matter apart from the design of the circumferential seal.

Cable control is positive and direct, and can be definitely measured in tons.

Cable control enables the raking struts to be done away with and supplies a cheaper and a better method of control. The existence of struts prevents the disc rising up to the roof, and thus a percentage of the holder is useless for storage. In a 2 million c.ft. holder the weight thus useless in the ineffective height of the holder is stated to be about 20 tons. If, while still securing the 2 million

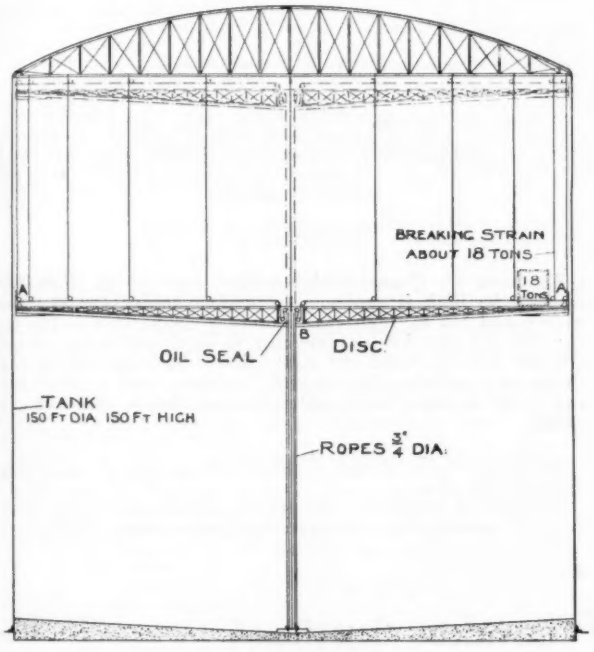


DIAGRAM Nº1

Diagram 1.—*This diagram shows a form of cable control in which all the cables pass through a common oil seal in the centre of the disc. By this arrangement the rise and fall of the circumference of the disc must conform to the movement of the centre.*

capacity, the saving is translated into a reduction in diameter instead of height, then the weight saved in the reduced areas of bottom, disc, and roof, and side, is considerably greater than 20 tons, perhaps double.

Cable control can be used in conjunction with existing sealing designs, but not with full efficiency, if the disc is still prevented from rising to the roof by reason of the space required for certain features of the design.

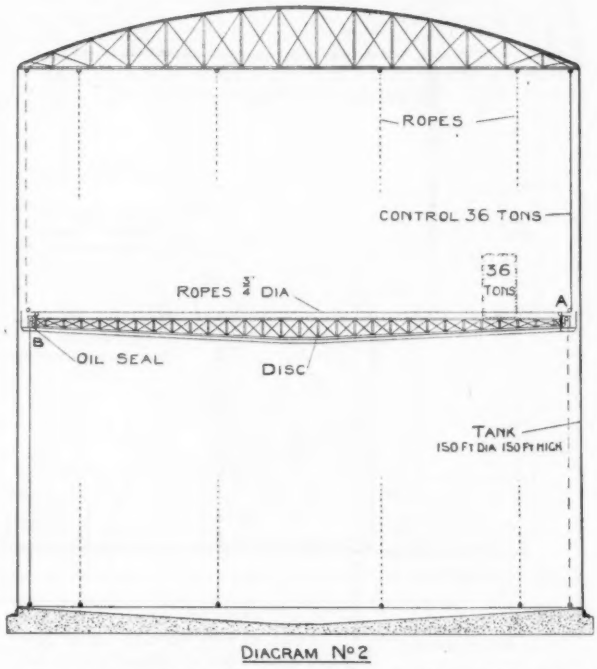
The salient points of a suggested seal not shown are simplicity, and the provision of a duct in which any gas leakage is carried away and discharged outside the holder. The metal parts have been designed to be without complication, and to be cheap to make and to fix.

The duct is connected with the roof by a walking pipe which forms a free exit for any escaping gas, which naturally escapes under a slight pressure into the duct.

The duct is supplied with a flow of air by an air pump or pumps driven by a cable and the disc movement.

It will be gathered from these remarks that it is claimed that a modern type holder can be built in which the disc cannot tilt, and in which no escaping gas can enter the upper part of the holder.

As to cost, it will be seen that a smaller holder than the normal can be made for a given capacity, thus saving considerable weight.



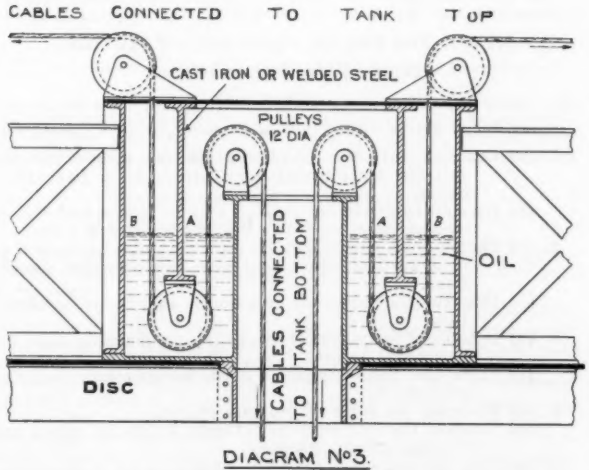
DIACRAM Nº2

Diagram 2.—*This diagram shows a disc holder with cable control. So long as the cables are able to resist any possible strain, which in fact is almost negligible, it is not possible for the disc to be otherwise than horizontal. Also the disc can rise almost to the roof, and thus have a more effective travel than is possible in the usual design.*

In place of a comparatively elaborate and expensive system of sealing and disc control, a cheap cable control method and a simple sealing arrangement are suggested. Greater security, less cost, is the net claim.

It is claimed that the cable control method is economical as well as efficient.

The accompanying diagrams are designed to bring out the chief points of steel cable control. It is claimed that a gasholder built according to the diagrams would be both safer and cheaper than a disc holder as now constructed. The chief points are: The disc cannot tilt when



DIACRAM Nº3.

Diagram 3.—*This diagram shows the circular seal common to all the cables at the centre of the disc. Under working conditions the oil is depressed in A and rises in B, which is open to the atmosphere at the exit point of the cable.*

controlled by steel cables; cost is saved through the simplicity of the seal itself, and because it enables the disc to rise close to the roof, which allows the height of the holder to be reduced by about 10%, or the diameter of the holder reduced. Diagrams 1 and 2 show how complete is the cable control, and that only a disturbing influence of tons could have any actual effect. Such a control could be secured for existing disc holders.

Each rope attached to the roof passes under a pulley, fitted with adjustment, and then across the crown and through an oil seal to its anchorage. When each cable is in due tension the point marked A can only fall below the horizontal through a lengthening of the cable, which is inconceivable. In the rise and fall of the disc the ropes have no movement, and offer a passive resistance only. They are subject to no strain except that induced by any tendency of the disc to tilt through abnormal friction against the side. So long as there are sufficient points A in the circumference, the distance from A to roof *plus* that from B to the anchorage remains a constant dimension throughout the disc's rise and fall.

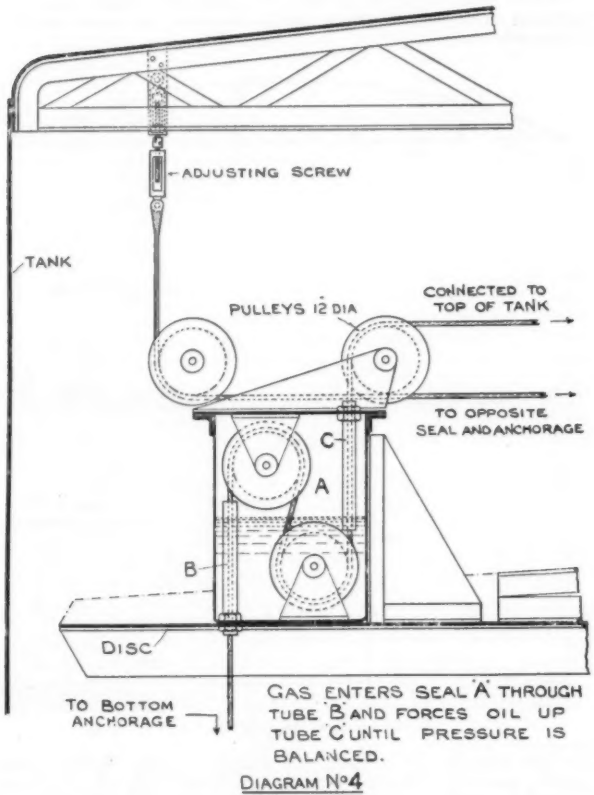


DIAGRAM 4.—*This diagram shows the construction in outline of the cable oil seal as fixed at the circumference of the disc.*

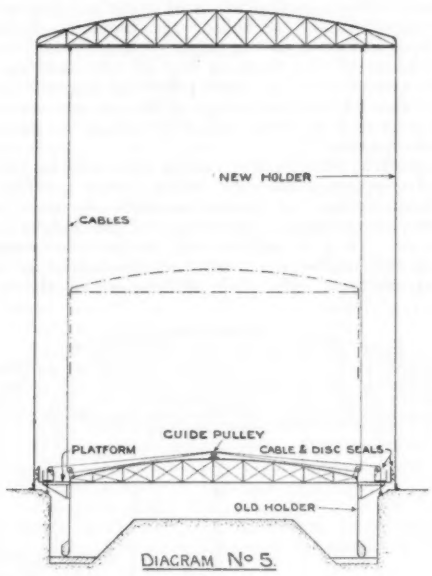


DIAGRAM 5.—*If an existing holder, say,* 100 *ft. diameter and* 75 *ft. high is replaced by a disc holder* 120 *ft. diameter and* 150 *ft. high (the standard proportion is* 120 *ft. by* 180 *ft.) the holder capacity is increased from about* 750,000 *c.ft. to* 1,700,000 *c.ft. After the removal of the outer and middle lifts and the columns and girders the inner lift is fitted with an extension shown as* 10 *ft. in width.*

Diagrams 3 and 4 show in detail the passing of the cables through the disc.

Diagram 5 illustrates the greatly increased storage that may be provided by re-construction of existing holders.

City and Guilds of London Institute

The following questions were set in the City and Guilds of London Institute Examinations for 1933 in the subjects named:

MINOR COURSE IN GAS-WORKS PRACTICE.

Tuesday, May 2, 7 to 10 p.m.

(*Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.*)

1. (*a*) Describe, with the aid of a sketch, one type of furnace suitable for burning coke breeze in a Lancashire boiler.
   (*b*) Give an approximate analysis of what you would regard as a satisfactory waste flue gas from such a fuel.
2. (*a*) Sketch cross and longitudinal sections of a horizontal *or* of a vertical retort and give the principal dimensions.
   (*b*) Describe the materials commonly used in its construction.
3. (*a*) Describe briefly one type of stoking machine used for horizontal retorts.
   (*b*) State the time required for discharging and charging one retort.
4. (*a*) Describe one form of pressure gauge.
   (*b*) Explain the relationship between inches of water and lbs. per sq. in. pressure.
5. Describe the function of the relief holder used in connection with water gas manufacture. Indicate its position in relation to the other parts of the plant.
6. (*a*) Describe generally the condensate obtained from crude coal gas and carburetted water gas respectively.
   (*b*) Explain the difference between free and fixed ammonia in ammoniacal liquor.
7. Describe the construction and method of using one type of apparatus for determining the calorific value of gas.
8. (*a*) Describe a method of sampling a truck of coal and preparing the sample for testing.
   (*b*) What special precautions should be observed when sampling unscreened coal?

MINOR COURSE IN GAS SUPPLY PRACTICE.

Tuesday, May 2, 7 to 10 p.m.

(*Not more than six questions to be attempted.*)

1. State the types of gasholders in general use. How is the pressure obtained from a waterless holder? (*30 marks.*)
2. Describe the plant and tools used in laying a gas main, "rigid" joints being employed. Sketch one of the completed joints. (*30.*)
3. What recent improvements have been made in the design of dry gas meters? (*30.*)
4. Wrought-iron piping having been installed in a house, how would you proceed to test it for soundness? Sketch the apparatus used. (*30.*)
5. It is desirable to reduce to a minimum the discoloration of ceilings above gas fittings. From what cause does discoloration arise and what remedy would you adopt? (*20.*)
6. What purpose does compression serve in the efficient running of a gas engine? (*20.*)
7. Describe a water heater suitable for use above a domestic kitchen sink. (20.)
8. What do you understand by the following terms when applied to gas heating:—
   (*a*) Radiation,
   (*b*) Convection? (*20.*)

GAS FITTING.

GRADE I.

Monday, May 1, 7 to 10 p.m.

(Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.)

1. Give a list of the tools and materials that you would require to join a meter cap and lining to a length of ¾-in. lead pipe. Sketch the two most important tools.
2. In what circumstances would you use the following pipes in gas fitting work:—Brass, copper, iron, lead, and compo?
3. Give an outline sketch of a modern inverted gas burner; name the various parts, and state what materials are used for them.
4. How many hours of use are obtainable from the following appliances from one therm of gas:—
   (*a*) Large inverted burner,
   (*b*) the by-pass for a lighting burner,
   (*c*) a 7-radiant gas fire,
   (*d*) an 8-gallon wash copper?
5. How many square feet of material would be required to make up a 20-ft. length of 6-in. circular flue pipe? Assuming that the material weighs 1¼ lbs. per square foot, what would be the total weight?
6. Sketch a baffler and flue terminal, and describe briefly their purposes.
7. Describe a method of testing an installation for soundness, where no gas is available, and make a sketch of the apparatus that you would use. If the installation were unsound, how would you proceed to find the escape?
8. How would you carry out the following work, and what tools and materials would you require to:
   (*a*) cut out and insert a tee on a supply under a wooden door,
   (*b*) make a branch connection with ½-in. compo into 1-in. compo,
   (*c*) fix a bracket to an existing ¼-in. point on the wall.
9. Describe fully how you would carry out the work of thoroughly cleaning a cooking stove in a consumer's house. After you have completed the work a complaint is made that one of the ring burners smells, when in use; to what is this due, and how would you remedy the trouble?

GRADE II.—WRITTEN PAPER.

Monday, May 1, 7 to 10 p.m.

(Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.)

1. Give a list of the uses of a pressure gauge on the district, and describe briefly how you would proceed to use one in each of the situations that you mention.
2. Sketch a meter with side connections fitted with a by-pass. Give the size of the meter and the names and sizes of all its fittings. Explain how you would expel the air from such a meter after you had fitted it.
3. Sketch a pressure gauge other than the **U** type, and explain how it operates.
4. Describe the purpose of each of the following accessories, and make a sketch of one:
   (*a*) A geyser baffler,
   (*b*) an economy or cut-out valve as used in a hot-water installation,
   (*c*) a back-pressure or non-return valve,
   (*d*) a clock controller.
5. Explain fully the construction and operation of a modern form of switch for gas lighting. What precautions should be adopted when fitting the type you have described?
6. Detail the manner in which you would test for accurate working the thermostats fitted to:
   (*a*) A cooking stove, and
   (*b*) a low-consumption storage water heater.
   How would defects be apparent?
7. Why are some gas appliances fitted with atmospheric or bunsen type burners and others with luminous burners? If you had to decide upon the type to use for a particular appliance, what points would you consider before deciding?
8. Describe the difference between a constant pressure governor and a volumetric governor. Give a sketch of any constant pressure type, and describe its action.
9. Fig. 1 shows the design and dimensions of a hood fitted over a cooking stove. How many square feet of material are required to make this, excluding seams?

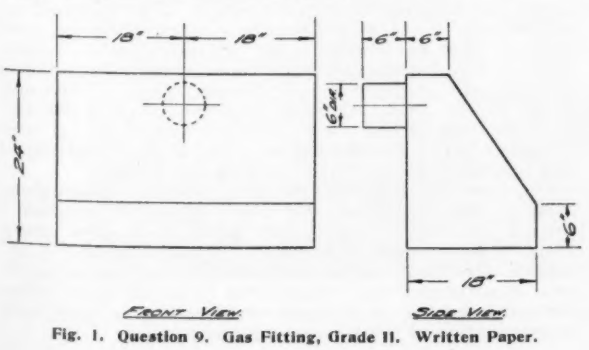


Fig. 1. Question 9. Gas Fitting, Grade II. Written Paper.

GRADE II.—PRACTICAL EXAMINATION.

Saturday, April 29, 2.30 to 6.30 p.m.

(Candidates must attempt all questions.)

The following materials to be supplied to each candidate:

2 ft. 3 in. of 1-in. lead pipe (gas weight); one 10-light meter union; one 1-in. lead to barrel union; one piece of ¾-in. steam barrel 5 ft. long.

1. Weight the governor fitted to the cooking stove to give a desirable pressure, and adjust all burners to operate at this pressure. Explain to the examiner your reason for your choice of pressure. (½ *hour; 30 marks.*)
2. Make up a 1-in. meter connection to the dimensions shown in fig. 1. No springs or bobbins are allowed. (1½ *hours; 70 marks.*)

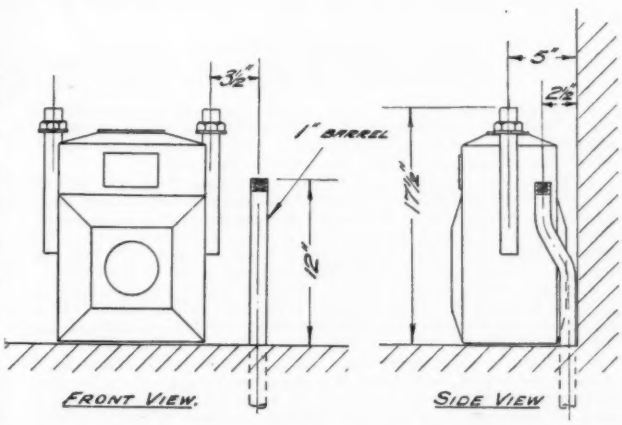


Fig. 1. Question 2. Gas Fitting, Grade II. Practical Examination.

3. Explain to the examiner the operation of a rod type thermostat. (¼ *hour; 15 marks.*)
4. With the aid of the forge set the ¾-in. piping over the 4-in. diameter obstruction in the corner of a building as shown in fig. 2. Work to the dimension shown. (1½ *hours; 70 marks.*)

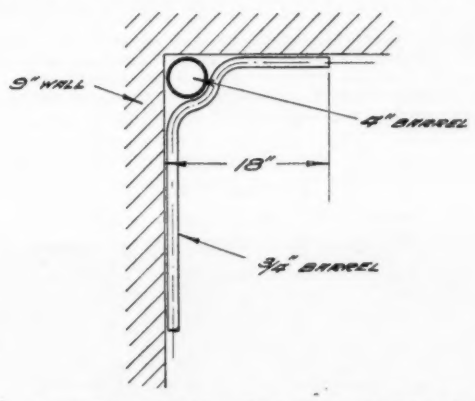


Fig. 2. Question 4. Gas Fitting, Grade II. Practical Examination.

5. Regulate the 3-light lamp leaving the correct flames, without mantles. Tell the examiner the hourly gas consumption and approximate candle-power of the lamp. (¼ *hour; 15 marks.*)

GRADE II.—VIVA VOCE EXAMINATION.

Saturday, April 29, 10.30 a.m. to 1 p.m.

1. If in the course of your duties you were sent to add water as required to a larger wet meter, what exactly would you do? (*20 marks.*)
2. What is the difference between the thread in a malleable iron elbow and the thread in a socket of the same size used for a connector or long screw? How long should the screwed thread be on ¾-in. piping? (*20.*)
3. What is the approximate weight of (*a*) a gallon of water and (*b*) a cubic foot of water? How many gallons of water can be contained within one cubic foot? (*20.*)
4. A pipe fitting known to be leaky is connected to a gas supply pipe and plunged to the bottom of a pail filled with water. The pressure of gas inside the fitting is 4 in. water gauge. No bubbles rise to the surface—why is this? (*20.*)
5. How would you advise a consumer who, while you were fitting a cooking stove, asked you how she should clean:
   (*a*) The enamel linings of the oven;
   (*b*) the hotplate burners;
   (*c*) the taps, if chromium-plated? (*20.*)

FINAL EXAMINATION.—WRITTEN PAPER.

Monday, May 1, 7 *to* 10 *p.m.*

(*Not more than six questions to be attempted. The maximum number of marks obtainable is the same for each question.*)

1. You are instructed to fix two double oven cookers with front floats (top rail), back to back. These cookers are situated 40 ft. from the meter position, the meter position being 50 ft. from the main.

Give (*a*) the size of service required;
(*b*) the size of meter and connections;
(*c*) the size of supply pipe from meter to ovens.

Give a sketch showing the type of hood that you would recommend to be fitted over the cookers, assuming that the over-all measurements of the hotplates of the two cookers are 6 ft. 6 in. by 5 ft.

2. Give an outline sketch showing how you would fix a thermostat:

(*a*) in a room to be heated by four gas radiators,
(*b*) in a room heated by four hot-water radiators supplied by a gas fired water heater in the basement.

3. Describe any form of water heating system by gas suitable for a lavatory basin, kitchen sink, and bath. Give a sketch showing all connections, size of pipes, and size of storage vessel. State the advantages of the system you describe.

4. What are the common defects associated with gas service pipes and how would you proceed to remedy them? State what provisions you would make for the service to enter a large building, if it were found impossible to lay the service until some weeks after the outside walls had been erected. It may be assumed that the wall is 2 ft. thick and asphalted on the outside.

5. What would be the total weight of water in a tank 4 ft. 3 in. long by 2 ft. 4 in. wide by 2 ft. 6 in. high when filled? How many therms would be required to raise the temperature of the water through 40° F. assuming the efficiency to be 50%?

6. What do you understand by gas pressure? How is it usually measured, and what is a good working pressure to give satisfaction with modern apparatus? What amount of variation of pressure will modern apparatus bear without giving trouble? Give the equivalent of 100 in. of water pressure in inches of mercury and lbs. per sq. in.

7. You are requested to fix a 200-light wet meter. State in detail the procedure that you would adopt in carrying out this work, and what tests you would apply before leaving the job.

8. On lighting and industrial installations using high-pressure gas, it is sometimes found, when the driving belt of the compressor is thrown on to the loose pulley or the electric motor is switched off, that this has a serious effect on the gas meter. What is the cause of this and what would you recommend to remedy it?

9. Make a sketch and describe step by step how you would fix a 5-light superheater outside lamp to any type of shop fascia with which you are familiar. Give a description and a sketch of the method you would adopt to light the lamp automatically at 6 p.m. and to extinguish it at midnight.

FINAL EXAMINATION.

PRACTICAL TESTS.

Saturday, April 29, 2.30 *p.m. to* 6.30 *p.m.*

(*Candidates must attempt all questions.*)

The following materials to be supplied to each candidate:
3 ft. of 1¼-in. lead pipe, 6 in. of ¾-in. lead pipe, one 20-light meter cap and lining, one 1¼-in. lead-to-barrel union, one 5-ft. length of 1-in. steam barrel, 2 ft. 6 in. of well-annealed ½-in. solid-drawn 18-gauge polished brass tube.

1. Fit up pressure recorder to point, place chart or drum or dial, and leave ready for use. (½ *hour; 20 marks.*)

2. With the material provided make up the meter connection to suit the conditions as shown in fig. 1, and make saddle joint

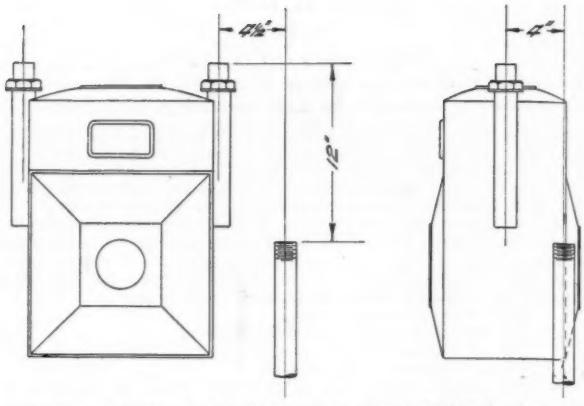


Fig. 1. Question 2. Gas Fitting, Final, Practical Examination.

in any convenient position. Springs or bobbins may be used. (1½ *hours; 60 marks.*)

3. Set the 1-in. diameter gas barrel provided to run along face of wall and up in corner marked A in fig. 2. (1¼ *hours; 55 marks.*)

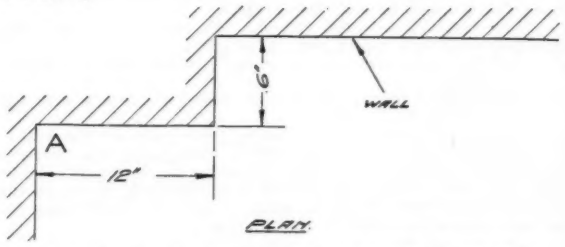


Fig. 2. Question 3. Gas Fitting, Final, Practical Examination.

4. Dismantle lamp, re-assemble, and adjust to give best results. Explain to the Examiner the functions of each part and state the candle-power and consumption of the lamp. (½ *hour; 35 marks.*)

5. Set the piece of ½-in. brass tube provided over the section of curb, and put a thread on each end. (½ *hour; 30 marks.*)

FINAL GRADE.

VIVA VOCE EXAMINATION.

Saturday, April 29, 10.30 *a.m. to* 1 *p.m.*

1. What tests would you apply to ensure that a geyser which you had just fitted was left in a satisfactory condition? (*20 marks.*)

2. Why is a baffler inserted in a geyser flue? Is it necessary to fit one on a high-consumption water heater flue? (*20.*)

3. How would you proceed to exchange a defective main cock in a cellar with the gas on? (*20.*)

4. Explain to the examiner the uses of the following and describe briefly how they operate:
(*a*) A leak detector,
(*b*) an anti-fluctuator,
(*c*) a thermostat,
(*d*) a constant pressure governor. (*20.*)

5. A consumer requires a low-consumption water heater fitted on a slot meter supply. What would you recommend to get over the difficulty of the burners being left on when the meter shuts off? (*20.*)

CONTINENTAL NOTES

CATALYTIC REDUCTION OF PHENOLIC COMPOUNDS TO AROMATIC HYDROCARBONS.

A preliminary paper by T. Bahr and A. J. Petrick was abstracted in the "GAS JOURNAL," 1933, 202, 401 (May 17). The same authors, in *Brennstoff-Chemie*, 1933, 14, 187-193 (May 15), describe methods by which the catalyst is best prepared and may be regenerated when necessary.

The most active catalyst is prepared from metallic molybdenum either (1) by solution in nitric acid followed by evaporation in presence of the carrier and roasting in air at 360°-400° C. to form the oxide, or (2) by oxidation of the metal powder in air at 450°-490° C.

The catalyst may be used either alone (if prepared by method (2)) or supported on a carrier such as Stuttgart Masse. In the latter case the oxide content may be 25-30%.

The activity of the catalyst gradually falls. Originally, a 100% reduction of cresol to toluene is effected and the conversion falls to 75% after a weight of cresol equal approximately to 14 times that of the catalyst has been treated. The inactivation of the catalyst is due to accumulation of high boiling bye-products on it and to reduction of the molybdic oxide to a lower oxide. Regeneration may be effected by roasting the spent catalyst in air at 400°-450° C. in the case of the powder catalyst, but is not so satisfactory in the case of the supported catalyst. Sulphuretted hydrogen does not affect the catalyst adversely.

The reduction of phenols was studied both at atmospheric pressure and at higher pressures. When the reaction is carried out under pressure, partial hydrogenation occurs. Thus, when a working pressure of 20 atmospheres is employed, the resulting neutral oil contains approximately 40% of saturated and unsaturated hydro-aromatic hydrocarbons, whereas, at atmospheric pressure, no appreciable hydrogenation of the benzene ring occurs.

ARDOR HOUSE, ST. PETER'S GREEN, SHOWROOMS.

GAS IN BEDFORD 1833-1933

In the spring of 1833, when William IV. was still King of England, 23 men of Bedford formed themselves into a partnership for the purpose of making and supplying gas for the lighting of the streets, shops, dwelling houses, and other buildings of the town. "The object and business of the company," according to the Deed of Co-partnership, was to be "to manufacture and produce inflammable air."

Bedford.

Though Bedford was already a growing town in 1833, its streets were still unilluminated except by sperm oil lamps at infrequent corners, and its houses were lighted by oil lamps and candles. It was to relieve this gloom that the newly-formed Gas Light Company set their hand. They built their works on a plot of land 120 ft. long and 100 ft. wide, between Priory Street and Greyfriars Walk, purchased for £304. The retort house is now "The Church of the Good Shepherd." The difficulties of the early stages of operation proved too much for the first manager, who resigned in February, 1834, and the Directors took over the management of the works themselves, attending weekly by rotation at the gas-works. But in 1838 the management of the works was entrusted to Mr. Henry Smith, who retired from the managership after 27 years' service, during which time the gas revenue increased from £400 to £4000 per annum, and his place was taken by his son, Mr. William Hill Smith in 1864.

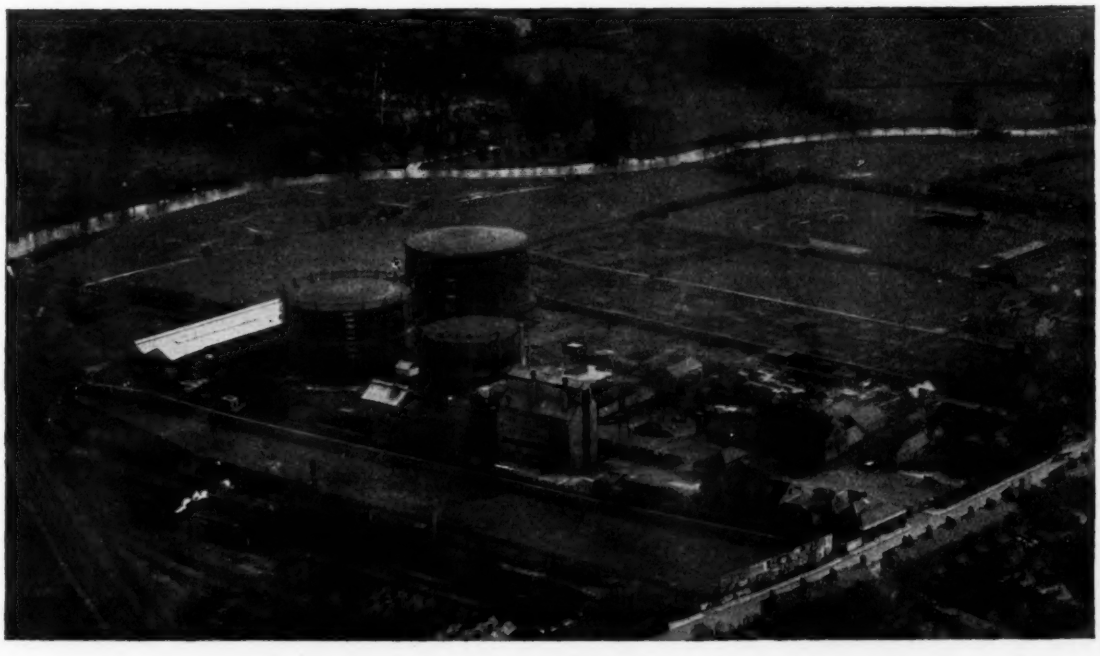
By June, 1864, an Act of Parliament had been conferred upon the Company, new works in Ford End Road were in action, under the Bedford Gas Act of 1864, and manufacture at the old works had ceased.

The new site was chosen with an eye on the system of transport—the railways—which were then establishing themselves in Bedford. The new works were designed by William Smith, who re-erected one of the gasholders from the Priory Street works, which had a capacity of 20,000 c.ft. The present largest holder has a capacity of 1½ million c.ft.

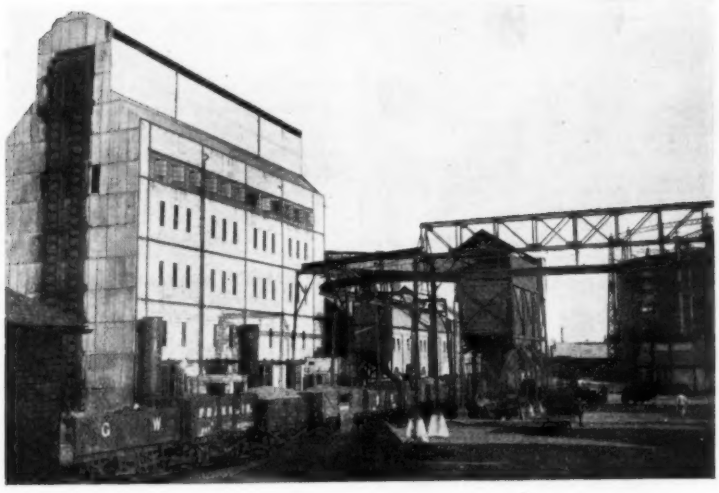
Early in the 'eighties the Town Council looked into the question of purchasing the gas-works, but while they were doing this the advent of electricity was announced. Possibly this had something to do with the decision of the Council not to proceed with the purchase scheme, but it was not until 1894 that the electricity undertaking was set up in Bedford.

By 1914 the horizontal retorts had been converted for machine operation, but in 1925 it became necessary to redesign the plant. By this time the works had become increasingly surrounded by residential property, and advantage was taken of the Glover-West system of continuous carbonization in vertical retorts to abolish the smoke and steam inseparable from horizontal retorts and coke quenching.

In the hundred years the sales of gas in Bedford have increased to 373 million c.ft. To-day there are 8756 slot meters and 3149 ordinary meters in use. There are 8068 cookers out on hire, together with 1105 gas fires, while many hundreds of gas cookers, fires and water-heaters and



AERIAL VIEW OF THE PRESENT WORKS.



A GENERAL VIEW OF THE PRESENT GASWORKS AT BEDFORD.
Showing Glover-West retort house.

other appliances have been sold outright or on hire-purchase terms. The introduction of electricity has simply served to stimulate the development of gas, particularly as a heating and cooking agent. Its most important bye-product, coke, is now carefully cleaned and freed from dust.

On Tuesday of last week a distinguished gathering attended a luncheon held at the Co-Partners' Hall, the recently completed headquarters of the Company's Works Club.

The gathering was presided over by the Rev. Paul W. Wyatt, Chairman of the Company, and among those present were Sir David Milne-Watson, LL.D., D.L. (Governor of the Gas Light and Coke Company), Mr. Ralph E. Gibson (President of the Institution of Gas Engineers), Mr. W. Grogono (President of the Eastern Counties Gas Managers' Association), Mr. Thomas Glover (of Norwich), Lieut.-Col. Sholto Ogilvie (Joint Manager of the National Gas Council), Mr. J. C. Walker (General Secretary of the British Commercial Gas Association), Mr. H. G. Ruggles (Engineer and Manager, Leighton Buzzard Gas Company), Mr. A. S. Campbell (Secretary, Wellingborough Gas Company), Mr. J. W. Auchterlonie (Engineer and Manager, Cambridge University and Town Gas Light Company), Mr. G. S. Eunson (Engineer and Manager, Northampton Gas Light Company), Mr. H. Banks (Northampton Gas Light Company), Major A. W. H. Lees, Col. G. H. Wells, Mr. G. C. Walker (Directors), and Mr. J. B. Hansford (Engineer and Manager) of the Bedford District Gas Company, and Mr. Cyril Davis, Mr. Harold Davis, Mr. J. F. Davies, Mr. F. Kenyon, Alderman F. J. West, Mr. Ernest West, Mr. A. G. Bird, Mr. T. A. Tomlinson, and Mr. R. Glover.

The toast of the " Bedford District Gas Company " was proposed by Sir DAVID MILNE-WATSON, who, after referring to the early history of the Gas Industry, spoke of the advent and development of electricity and said that the enormous progress made in the production of gas, both in the sphere of heating and lighting, had enabled it more than to hold its own with its rival. Both services, however, were to-day face to face with a common foe—oil. The imports of fuel oil, both for domestic and industrial purposes, had enormously increased during the last few years to the great detriment of the coal industry, and the intensive campaign carried on by the big oil companies had negatived in large measure the effect of the " Buy British " movement. To a country whose greatest natural asset was coal and whose coal industry was already in difficult straits, this growth in the use of imported oil had caused uneasiness. The proposal of the Chancellor of the Exchequer to put a tax on oil for the double purpose of securing revenue and of affording protection for the coal industry had the approval of all who realized that an increased use of this country's coal resources must play a most important part in helping us out of our economic difficulties. The National Gas Council, on behalf of the Industry, was therefore giving its full support to the Chancellor's proposals, even though the tax, which, of course, fell upon gas oil as well as on fuel oil, would mean that in the aggregate undertakings making carburetted water gas would have to contribute to the Exchequer about £250,000 per annum in the form of tax.

The toast was acknowledged by the CHAIRMAN, who related what the Bedford Gas Company had done to bring its plant up-to-date and to anticipate future demands. He also spoke of the co-partnership scheme, which he was largely instrumental in introducing.

Mr. S. R. WELLS, M.P., proposed the " Gas Industry," and gave facts and figures showing its enormous scope and importance. He expressed the view that there was room for both gas and electricity in the modern world and that there was no need for cut-throat competition.

Responding to the toast, Mr. RALPH E. GIBSON said that they must not be content to act merely as gas suppliers but must provide gas service. In view of the activities of their competitors it would be necessary to spend more money on advertising in order to keep the advantages of gas continually before the public.

A further response was made by Alderman F. J. WEST, who contrasted the efficiency and comfort of a modern gas-works with the conditions of bygone years. He also reviewed the progress of the Industry throughout the world.

The toast was also acknowledged by Mr. CYRIL DAVIS.

The toast of " The Visitors " was proposed by Mr. G. C. WALKER, and responses were made by Mr. THOMAS GLOVER and the MAYOR OF BEDFORD.

Installation of New Glover-West Plant at Kilmarnock.

The Provost and Magistrates of Kilmarnock were present at a formal inauguration ceremony of new gas plant at Kilmarnock on Wednesday, May 24.

The installation, which was formally opened by Provost Smith, consists of 24 Glover-West vertical retorts, 50 in. by 25 ft. long. These now occupy the old horizontal retort house and are built in silica material with an enlarged fireclay steaming chamber at the base. The retorts are arranged in units of four and are fired by breeze-burning producers, two of which are capable of supplying the 24 retorts. The producers are of the latest step-grate type, fitted with wrought-iron doors and steam air blowers. Gauges are fitted to indicate the pressure of the steam, the temperature of the steam-air mixture, and the pressure under the grate and in the uptake flues. The coal is received by a West lip-bucket conveyor from the original push-plate conveyor. Coke to producers can also be handled by this conveyor into a storage hopper. The daily make from the new retorts is 2½ million c.ft.

These verticals have taken the place of intermittent verticals which have been demolished, and the bunkers for the intermittents have been lowered and are used as coke hoppers for local and railway sales, providing a total storage capacity of 110 tons. A West reciprocating coke grader has been superimposed upon the bunkers and receives its coke from the lip-bucket conveyor encircling the bench.

A waste-heat boiler of the Spencer-Bonecourt type has also been installed and is capable of generating 9000 lbs. of steam per hour. The boiler is equipped with a thermo-feed and high and low water alarm, and is operated by induced draught.

After the opening ceremony the company adjourned to the Gas-Works Recreation Hall, where several toasts were proposed. The toast of " The Contractors, Messrs. West's Gas Improvement Company, Ltd.," was proposed by Ex-Bailie Brown, the Convener of the Gas Sub-Committee, and Mr. R. B. Glover replied.

A FINE SHOWROOM FOR THE INDUSTRY

The Parkinson Stove Company's New London Premises

Ultra-modern in every particular, yet furnished and decorated in excellent taste, which makes an immediate appeal to the visitor, are the new showrooms of the Parkinson Stove Company, in Terminal House, Grosvenor Gardens, S.W. 1, which we had the privilege of inspecting the other day.

The first thing that strikes one on approaching the main showroom from the street is that every detail of the interior right to the farthest corners is plainly discernible from outside—which is accounted for by the fact that the new patent "non-reflecting" windows have been adopted. These windows are produced by Messrs. E. Pollard & Co., Ltd., and were referred to in the "GAS SALESMAN" for February last. For a showroom of this nature a window of this description is ideal and provides a definite appeal to the "man-in-the-street" to enter and inspect more closely.

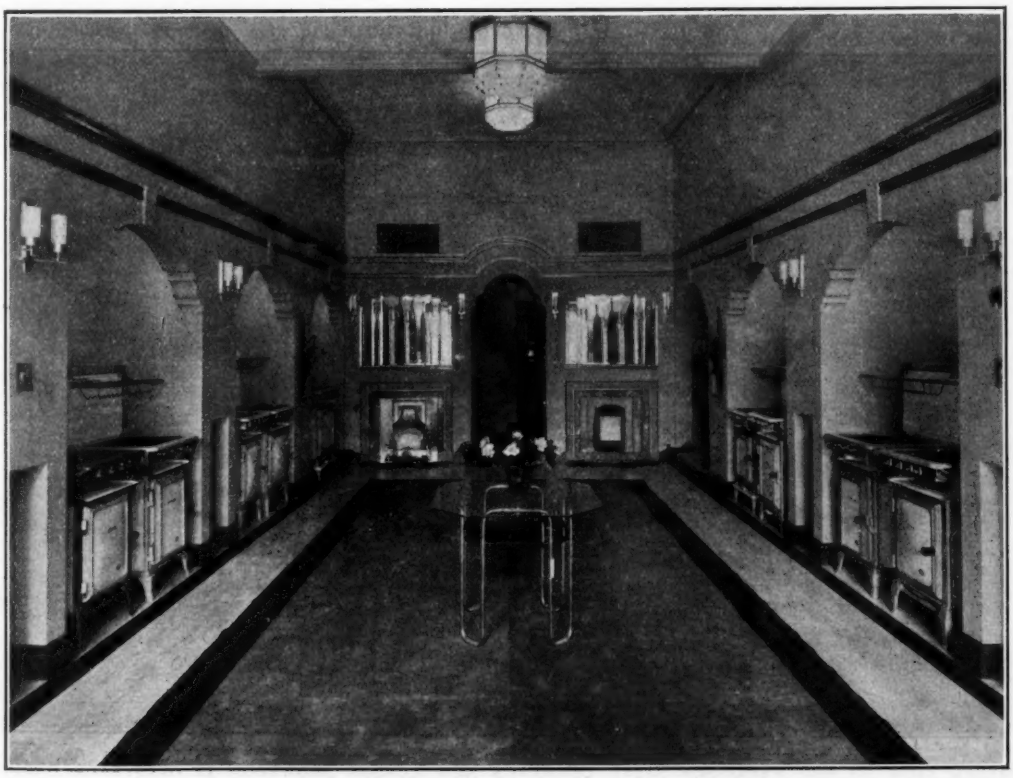
Upon entering the showroom it is at once obvious what care and attention have been devoted to displaying each individual appliance. Each is shown in its separate alcove, brilliantly illuminated by concealed lighting from above, while supplementary lighting for the showroom as a whole is provided by the latest type of switch-controlled, glass-panelled ceiling lights, being four-burner fittings of a most attractive style, well in keeping with the general decorative scheme.

SOME WELL-KNOWN APPLIANCES.

It is hardly within the scope of this note to refer in detail to all, or even most, of the apparatus so effectively displayed in the new showrooms; suffice it to refer briefly to some of the typical appliances shown, which have made the name of Parkinson a household word in the Industry.

Of the fires, a new line in regard to the "Curvex" is the inset type, a feature of which is that no metal parts rise above the level of the fender plate. This appliance built into an attractive surround makes an exceedingly pleasing fireplace.

There are many points in the new "Calthorpe" table cooker which must commend themselves to the Industry. Its great advantage is the large cooking capacity of both oven and hotplate. On the hotplate the whole of the space is usefully occupied. The four boiling burners are at one end, with an exceptionally large double burner grill at the other end, and a warming plate with small simmering burner in the centre. Flat top bars are fitted giving firm pan support. The grill pan is adjustable for height, and the hotplate is a distinct advance on previous types. The cooker embodies the standard two-burner "Calthorpe" oven and a smaller single burner oven, which can be used as a hot-closet. "Ajusto" oven heat control is fitted, while other features are the "dome" doors and concealed



An attractive setting of the "Curvex" inset gas fire at the Parkinson Stove Company's new showroom.

taps. Other of the firm's well-known cookers are to be seen, including the " Newpark," while of the fires the " Stepholme " is an attractive example of a new and distinctive design embodying the constructional features of the recently introduced panel fire. Small alcoves contain modifications of the firm's " Cabinette " heater in pleasing finishes. The " Indusa " heater is, of course, in evidence, as also is the " Welwyn " panel fire, while other gas fires are shown in distinctive settings.

Passing into a further showroom behind, one sees a number of the firm's geysers, all properly connected up and vented, delivering hot water into a common recessed trough running in front of the row of appliances. These water heaters include the " Treasure " in white porcelain enamel finish, with metal parts in polished chromium plating and fitted with interlocking gas and water taps, or patent safety gas valve; and also the distinctive " Pearl " geyser. A further range of cookers are also displayed here, including the " Birma," which is strikingly original in design, it being possible easily to detach the standardized enamelled door and side panels for re-conditioning with a minimum of labour and trouble, thus saving maintenance costs.

The lighting of this room is effectively carried out by means of high-power gas lights above a glass panelled ceiling, giving the appearance of sunlight.

Efficient Ventilating System.

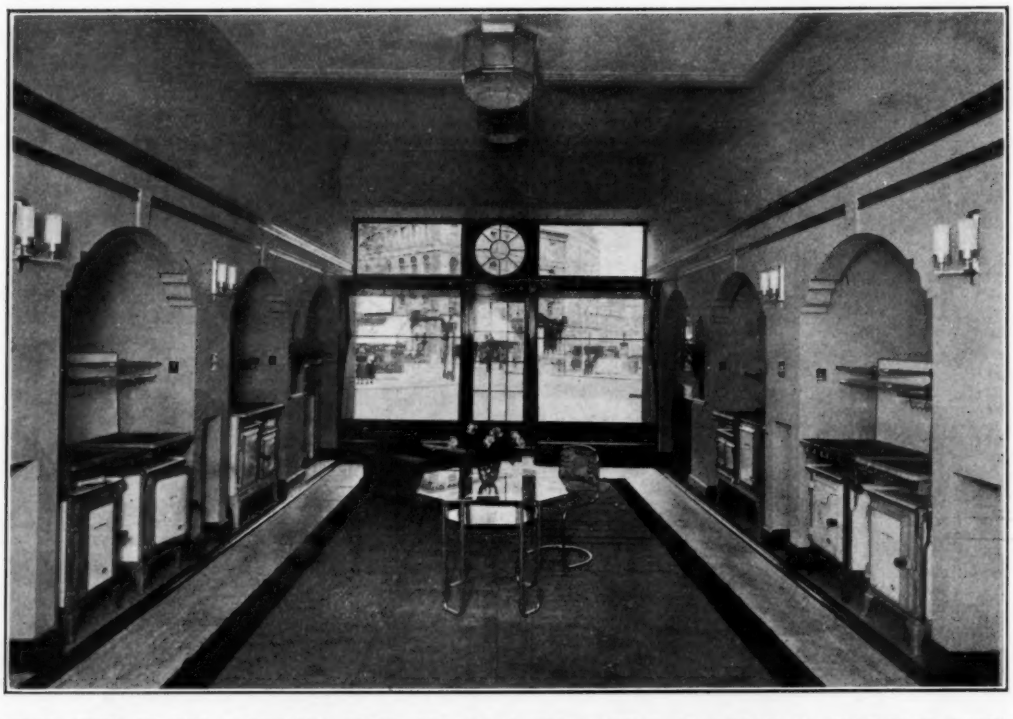
Further extensive showrooms are arranged in the basement, where again the decoration and lighting schemes are up-to-date and effective, here also being situated the ventilating system for the whole premises. A powerful fan blows fresh, cleaned air through ducts into all the rooms, while a large gas heating apparatus is used in conjunction with this to warm the air in cold weather. This system, in conjunction with individual regulators, assists the chimney pull, thus ensuring effective evacuation of the products of combustion, and eliminating draughts.

The basement showrooms are devoted to a further display of gas fires, in particular the " Panno " and " Flatholme " models, the latter being ideal for housing estates, small houses, flats, offices, &c. Built on simple lines, with shallow projection, models are shown in attractive cast-iron surrounds in imitation marble and other pleasing colour finishes. A small room is set up as a bachelor's model kitchen, while a final section contains a display of the Parkinson Stove Company's cooking apparatus designed for heavier service in restaurants, hotels, institutions, &c. Here again the lighting is effectively carried out by units above the glass panelled ceiling.

A Novel Boiling Burner.

An interesting development of the ordinary gas boiling ring is displayed in the showrooms, which has only recently been placed on the market by the firm. The novel departure lies in the fact that the ring, from which radiate at right-angles the four utensil supports, is set in a shallow saucer-shaped bowl designed to catch and retain any liquid which should happen to boil over. The fitting is attached from underneath the bowl to the gas supply in the normal way by means of flex tubing, while it has the advantage of not having to be placed on a hearth when in operation. The utensil supports are finished in aluminium paint, while the bowl is supplied in silver-grey mottled enamel finish and in various colours.

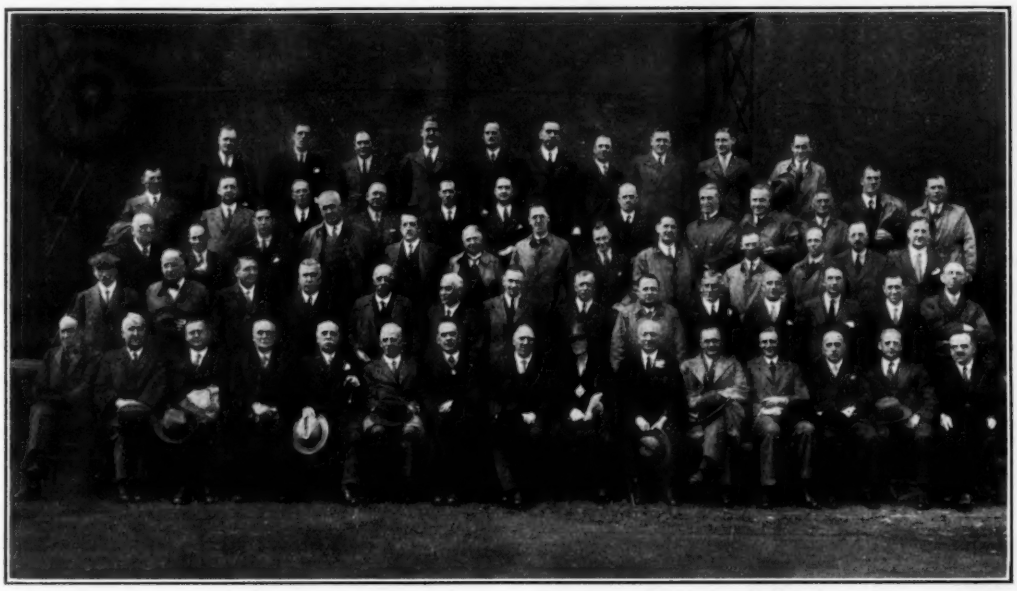
Altogether these new showrooms well repay a visit; they are fully worthy of the high traditions of the Industry they serve and a credit to a great manufacturing concern.



ANOTHER VIEW OF THE PARKINSON STOVE COMPANY'S NEW LONDON SHOWROOM IN GROSVENOR GARDENS.

Midland Association at Stafford

Two Prosperous Undertakings Visited



PHOTOGRAPHED AT THE STAFFORD GAS-WORKS.

"This is one of the proudest moments of my life," declared Mr. T. H. Poulson, President of the Midland Association of Gas Engineers and Managers, when replying to a toast which had been proposed at a luncheon at Stafford last Thursday. The luncheon, to which over one hundred sat down, was at the Swan Hotel, by invitation of the Chairman and Members of the Stafford Corporation Gas Committee, of whose undertaking Mr. Poulson is Engineer; and the occasion was the Spring Meeting of the Association. Stafford is an attractive town, and it was seen under the best conditions, while every arrangement had been made for the comfort of the visitors.

The Gas-Works.

The President's works were inspected in the morning, and many complimentary remarks were made regarding their general condition and lay-out. The members were received on arrival by Mr. Poulson, the Mayor (Mrs. E. M. South), Mr. G. Owen (Chairman of the Gas Committee of the Town Council) and Alderman R. J. Young (Vice-Chairman of the Committee). The members were divided into five parties, and were conducted round the works by Mr. Poulson, Mr. Charles Poulson (Assistant Engineer), Mr. S. T. Lea (draughtsman), Mr. L. Wilson (Chemist), and Mr. J. Poulson (of Oldbury).

The carbonizing plant consists of four beds of Glover-West continuous vertical retorts, eight retorts per bed, with a total nominal capacity of 2 million c.ft. per day. Coal is received in railway wagons which are tipped by hydraulic ram, the coal passing through a screen into the well of a gravity bucket elevator and conveyor, which delivers it into any of the eight 25-ton overhead storage bins. The coke is elevated to a Glover-West jig screen, on which it is graded to four sizes, each received in bunkers underneath. Coal and coke handling machinery are electrically driven, while the worm extractor gear is driven by a small gas engine, in duplicate. Two Spencer-Bonecourt waste-heat boilers (one spare) receive the waste gases from the settings. These are of the fire tube type with superheaters, and have each an evaporative capacity of 250 to 300 gallons per hour. Draught is induced by motor-driven fans.

The carburetted water gas plant is now in process of conversion from 500,000 to 1,250,000 c.ft. per day capacity, by Messrs. Humphreys & Glasgow. The remodelled plant will embody the back-run process and a steam-turbine driven Sturtevant blower. Gas is delivered into a 50,000 c.ft. relief holder, from which it is withdrawn by a steam driven "Gwynne" exhausting set, and mixed with the coal gas at the inlet to purifiers.

The fitting and cooker repairing shop and stores attracted a good deal of attention. The former has an area of 3800 sq.ft., and is fitted with machine tools driven by a "National" gas engine. There is a trichlorethylene degreaser for cooker parts, and a Morris 2-ton travelling crane. The cooker and general stores adjoining have a width of 30 ft., and a length of 176 ft., and are provided with a railway siding running the whole length.

Luncheon.

Large as was the attendance at the luncheon, the Swan Hotel proved fully equal to the occasion, and there was but a single regret on the part of those present—namely, that Sir John Ferguson Bell, who was to have attended, was prevented by another important engagement from doing so.

As a token of respect to the memory of two members of the Association who had died since the last meeting—Mr. John W. Allin, of West Bromwich, and Mr. John A. Harris, of Great Wigston—all stood silent for a short time.

Councillor George Owen, the Chairman of the Gas Committee, presided, and submitted the Loyal Toast. He was supported by the Mayor, the Vice-Chairman of the Committee, Alderman Tunnicliffe (Deputy Mayor), Alderman Pitt, and the Town Clerk. Among the guests was Mr. Hubert Pooley, now of Leicester, who was President of the Association 26 years ago, when he was at Stafford.

The Fame of Stafford.

Mr. Hubert Pooley said that, though he was very sorry that Sir J. Ferguson Bell was not present to propose the toast of "The Town and Trade of the Ancient Borough of Stafford," it was a pleasure to him to do so in Sir John's place. The Midland Association had always been most handsomely treated by those Local Authorities and Companies who were fortunate enough to place their confidence in the members as their experts. He had a great deal of happiness in his own association with the town of Stafford, and this made it an added pleasure to him to be given the honour of proposing her health. Stafford was world famed for her boots and shoes; locomotives from her workshops had also been sent to all civilized parts of the earth, and the same might be said of her motors and dynamos. Her salt was more or less accidentally discovered, and this industry had grown to a remarkable extent. To her more recent reinforced concrete industry he was sure they would all wish equal success. Her trades were very varied, and he felt that great encouragement had been given to strangers to establish themselves in her midst. This could only lead to the well-being and prosperity of the community. Since leaving Stafford, he had been a walking advertisement for her brine baths, which had repeatedly eased him of some of the aches and pains which flesh is heir to. As a town, Stafford was the centre of a great deal of agricultural activity in a county whose natural resources were very great indeed. Stafford was governed successively by Provosts, Bailiffs, and for the last 319 years by Mayors. The old inhabitants of the town seemed to have been very fond of Royal Charters, of which no less than nineteen were granted to the Borough between the time of John and the Fourth

In the Grounds of the Lotus Shoe Company.
Mr. R. J. Meiklejohn and Mr. C. H. Carder.

Three More Old Friends.
Mr. R. G. Shadbolt (left), Mr. W. G. Head, and Mr. Vincent Hughes.

Present and Past Engineers at Stafford.
Mr T H. Poulson and Mr Hubert Pooley.

George. Stafford's population had grown quite considerably since 1910, and she was to be commended upon getting down from the high-water line of rates levied to the reasonable figure of 11s. in the pound. Stafford was also to be heartily congratulated on the low price of her gas.

The MAYOR, responding, extended a hearty welcome to the visitors. She said the Corporation felt that the gas-works were very up-to-date, and were quite sure that they were most

Seen During the Day in a Main Street of Stafford.

The Gas Committee Chairman (left) and the President.

efficiently operated by their Manager, Mr. Poulson. It was a great honour to them that Mr. Poulson had been elected President of the Association.

Councillor OWEN, toasting the Association, agreed with the Mayor that it was a source of gratification to the Council that Mr. Poulson should have been elected President.

The PRESIDENT, in reply, on behalf of the members of the Association tendered sincere thanks to the Chairman and members of the Gas Committee for the kindness and hospitality they had accorded them. He was especially pleased that they had with them that day Mr. Pooley, who gave him his early training as a gas engineer. Mr. Pooley, who had served the Stafford Corporation faithfully and well for many years, would retire from his present position at Leicester in a few days, and they would all join in wishing him happiness for the future. They regretted the absence of Sir John Ferguson Bell, who, owing to an important appointment, found it necessary to cancel his visit. Both Sir John and Mr. Pooley occupied the Presidential Chair of the Association during the time they were at Stafford. The Industry those present represented was never more alive than it was to-day. In 1920 the sale of gas was 235 thousand million c.ft.; in 1925 it was 265 thousand million c.ft.; and in 1930 it was 290 thousand million c.ft. There were over 1300 gas undertakings in the United Kingdom. Last year nearly 18 million tons of coal were used in the manufacture of 330 thousand million c.ft. of gas. The Industry represented a capital investment of 200 million pounds; it employed directly some 113 thousand men; and the annual wage roll was over 15 million pounds. The Gas Supply Industry paid approximately 3½ million pounds a year in rates and taxes, and it was estimated that 36 million people used gas, the total number of meters in service being over 10 million.

A hearty vote of thanks was, on the proposition of Mr. R. S. RAMSDEN (Leamington), accorded the Chairman, for his presence with them that day.

By invitation of the Chairman (Alderman H. J. Bostock) and Directors of the Company, the afternoon was spent in going over the women's shoe factory of Messrs. Lotus, Ltd. In this huge model factory many thousands of shoes of all kinds for women are turned out weekly, by the aid of skilled operatives and machines of almost uncanny capabilities. It was understood that each shoe calls for some two hundred operations, which are carried out with absolute precision. The firm's factory for turning out men's footwear is at Northampton.

Tea in the Recreation Pavilion brought to a close a day of much enjoyment; but before separating, Alderman Bostock and his Directors were heartily thanked, on the proposition of Mr. R. J. MILBOURNE, seconded by Mr. R. S. RAMSDEN.

Responding, Alderman BOSTOCK assured the visitors that Mr. Poulson is very highly esteemed by those in business in Stafford. They were very pleased that Mr. Poulson was Gas Engineer at Stafford, because of the position his father held for many years in the works.

Cheaper and Better Water Pipes.

It is learned from a report issued by the Department of Scientific and Industrial Research that scientific research has produced an alloy which has resulted in the saving of 20% to 30% in the cost of raw material used extensively for water pipes, roofing sheet, guttering, and other applications in every class of building.

This scientific achievement is the result of metallurgical investigation conducted by the British Non-Ferrous Metals Research Association and at the Research Department at Woolwich. The practical testing of this new discovery, which is of far-reaching importance, has been carried out by the British Water Works Association, who, in an official circular, make definite recommendations for its adoption. Licences for its manufacture have been granted to the majority of the lead manufacturers in this country.

The great saving in cost is due to the fact that this alloy is 30% lighter for the same strength than ordinary lead, which not only results in the saving of as much as 30% in the metal costs, but also in a saving of freightage and handling charges, which, with such a heavy material as lead, is no small item.

Apart from the saving in cost the new alloy has other advantages. Not only has it a far greater resistance to fracture by vibration, which is an increasing trouble due to the enormous growth in heavy traffic, but also where lead suffers from corrosion through contact with such alkaline substances as lime and cement-mortar the new alloy is definitely more resistant to attack. It is surprising that these results are achieved by the addition of less than 2% of tin and cadmium to the lead.

The report* which has just been issued by the Building Research Board under the Chairmanship of Sir George Humphreys, K.B.E., M.Inst.C.E., will undoubtedly prove of great value to all who are engaged in constructional work.

* Department of Scientific and Industrial Research: Building Research Report No. 19. H.M. Stationery Office, 9d.

BOOK REVIEWS

Gas Analysis by Thermal Conductivity*

Reviewed by T. G. NOBLE, B.A.

"This book is addressed to all whose work involves the analysis of gases. Its object is to assist them in deciding whether the thermal conductivity method has any advantage for their purpose over the older-established methods, and, if so, what is the best technique to adopt." It is difficult to imagine a book which could more successfully accomplish these objects, or more adequately fill what has hitherto been a serious gap in technical literature.

The author traces the growth of the method from the experiments of Andrews in 1840, in a brief but adequate historical introduction, and proceeds to a very full account of its theoretical and practical aspects and their application to widely differing branches of pure and applied science. The mathematical side of the subject is fully treated, special points being dealt with in three appendices, but the non-mathematical reader is mercifully remembered and assisted by simple analogies. The scope of the book is perhaps best indicated by the following summary of its further contents.

Chapters II. and III. discuss the general principles of the thermal conductivity of gases in relation to their composition, and the hot wire conductivity bridge respectively. The main findings are conveniently summarized at the end of these and other chapters, and the author makes suggestions to be borne in mind in any future scheme for standardizing calibrations.

The succeeding chapters deal in detail with special forms of instrument—including the Shakespear, Bureau of Standards, Leeds and Northrup, Siemens and Halske, and Engelhard types—no direct preference for individual designs being expressed. Chapter VI. is devoted to a very full discussion of the merits of different types of resistance bridges. The time lag factor is considered in Chapter VII., and sensitivity in Chapter VIII.—in which the author reminds one that optimum sensitivity is not always the most important consideration.

The chapters on methods of calibration, the fundamental importance of which is emphasized, and on accessory apparatus, exemplify the author's zeal for minute detail (which, however, is never allowed to interfere unduly with the main development) and draw attention to a number of laboratory devices of general interest.

The remaining chapters (XIII.-XIX.) deal with special applications, the number of which is surprisingly large already and is likely to grow rapidly. Among them may be mentioned the analysis of boiler flue and other exhaust gases for carbon monoxide, carbon dioxide and oxygen, of fuel gases, and of gases obtained from liquid air, the fixation of atmospheric nitrogen, applications to aeronautics, the measurement of carbon dioxide in fruit stores, and the measurement of sulphur dioxide in the manufacture of sulphuric acid. A section on the use of the method in pure and applied research, including physiological and botanical applications, is included.

The book should be of great general interest to all connected with the technical branches of the Gas Industry. Some points of particular interest have already been mentioned, notably the analysis of flue bases. To these may be added the measurement of humidity, the detection of gas leakages, the determination of air/gas ratios, the measurement of permeability (*e.g.*, of rubber to gases), the efficiency of "dopes" in preventing diffusion through membranes, applications to chemical analysis, and the measurement of small gas flows. No surprise need be felt that the thermal conductivity method has not so far been successfully applied to the analysis of town gas, but its ability to indicate constancy or otherwise of composition may be of value.

The book is pleasantly written, copiously illustrated with photographs and admirably clear diagrams, and is provided with an index to authors and subjects. The value of the latter is considerably enhanced by the adoption of heavy type for the more important headings—a simple device, facilitating quick reference, which one wishes were more generally used. References to original papers are numerous and are conveniently placed at the foot of the page to which they refer.

Altogether this is a first-rate book, upon which the Cambridge University Press and Dr. Daynes are to be heartily congratulated—if, indeed, it is not an impertinence to congratulate one whose direct contributions to the subject treated are of such importance and so eminently fit him to write on it.

* "Gas Analysis by Measurement of Thermal Conductivity," by H. A. Daynes, D Sc , F.Inst.P. 357 pp. Cambridge University Press, 16s.

Report of the Livesey Professor at Leeds

Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C., Livesey Professor at the University of Leeds, has submitted his report for the session 1931-32 to the Chairman (Mr. C. F. Tetley, M.A., LL.D.) and members of the Livesey Advisory Committee on the work of the Department of Coal Gas and Fuel Industries (with Metallurgy).

The session under review was marked by a rise in the number of registered students from 25 to 32. Most of these have entered the University from school, but there is an increasing number of young men who, after a period of works practice, have decided to spend three years in the University. This has been done in order to obtain scientific and technical training, the need for which had been borne in upon them by experience and a conviction that this need would grow as their responsibilities increased. The blending of students of differing types so secured has distinct advantages.

There is also evident an increasing tendency for gas engineers and others in responsible positions in the fuel industries to send their sons to the University for a technical training.

One interesting development has been in the coal trade, where it is coming to be recognized that colliery officials, merchants, and salesmen should be more fully and precisely informed of the qualities of coal, its suitability for different uses, and the processes of selection and preparation which can be applied to it with technical and economic advantage. For the satisfaction of these needs the Departments of Fuel and Mining are collaborating. Moreover, all students of Mining are now attending a course in the Fuel Department, and all students of Gas Engineering, or of Fuel and Metallurgy, are attending a course in the Mining Department on the preparation of coal, including the principles of coal washing and dry cleaning.

The session has coincided with great economic depression, characterized by a lack of new enterprise and of opportunities for young men entering on industrial life. It is, however, gratifying to note that hardly any graduates of the Department are known to be unemployed, and so far the newly qualified men have all been placed. We anticipate that any renewal of industrial activity would restore that demand for our graduates in excess of supply to which we have been accustomed. It is to be noted, too, that in the Gas Industry, as has been evident from the proceedings of a recent conference addressed by Sir David Milne-Watson and others, a wider view is coming to be taken of the functions of a gas engineer. It is not enough, according to this view, that a gas company or authority should be able to manufacture gas, but it should be so placed as to be able to give expert technical advice to actual or potential gas consumers on the use of gas, particularly in furnaces for industrial purposes. This must provide openings for men trained, not simply in the routine of existing gas-works practice, but in the scientific principles of gas engineering in the widest sense, in the properties of fuels in general, and with some knowledge of metallurgical and chemical science. Such training it has been our aim to provide, and it is developed to meet or anticipate the needs of the fuel industries. Several of the recent appointments of our graduates have been to positions on the chemical engineering side of industry and in the utilization of gas.

The University has not, however, escaped the impact of the economic difficulties of the times, and this has necessitated a close scrutiny of expenditure. Our allocation from the University for departmental expenditure, including that on apparatus and research, has of necessity been somewhat reduced. This increases the difficulty of renewing or increasing equipment, and of maintaining the progressive policy which the Gas Industry is recognizing as so desirable. The same principle of financial economy has been applied by the Institution of Gas Engineers in curtailing the expenditure on one branch of the

work of the Joint Research Committee of the Institution and the University.

STUDENTS.

The analysis of the number of students in the Department may be stated thus:

—	1930-31.	1931-32.	1932-33.
1st year B.Sc. course	10	6	5
2nd ,, ,,	2	11	5
3rd and 4th years B.Sc. course	5	6	18
Post graduate degree students	3	5	5
,, ,, diploma ,,	1	1	1
Diploma students	2	1	0
Industrial research students	1	1	1
Occasional students	1	1	1
	25	32	36

It is seen from the figures quoted above that the numbers of the Department have been more than maintained. In addition to these students specially attached to the Department, courses in Fuel and Metallurgy are attended by students of Chemistry, Engineering, and Mining, and lectures on Steam Raising by students of Colour Chemistry, Leather Industries, and Textiles.

Appointments of old students during the period under review:

S. L. Wright, B.Sc.	Engineer and Manager, Sittingbourne Gas Company.
J. E. Knight, B.Sc.	Exeter Gas Light and Coke Company.
G. A. Thompson, B.Sc.	Gas Light and Coke Company.
C. B. Marsden, Ph.D.†	Head of Chemical Department, Hull Municipal Technical College.
W. S. Patterson, Ph.D.	Head of Chemical Department, Sunderland Technical College.

† Since deceased.

GRADUATES.

1932 (June).

M.Sc.	C. B. Bolland, B.Sc. A. H. Clucas has had his thesis accepted, but cannot graduate until 1933.
B.Sc. (Hons.) 2nd Class	J. E. Knight. G. A. Thompson.
B.Sc. (Ordinary) in Gas Engineering	A. C. Bureau. H. D. Brook.

National Gas Council

Annual Meeting of Executive Board for Scotland

The Fourteenth Annual Meeting of the Scottish Executive Board of the National Gas Council was held in the North British Station Hotel, Edinburgh, on May 5.

Mr. J. W. NAPIER (Alloa), the Secretary, apologized for the absence of the Chairman, Sir W. E. Whyte, who unfortunately was prevented from attending owing to family illness. Councillor CATTO (Aberdeen) was called upon to occupy the chair.

ANNUAL REPORT.

After the minutes of the last meeting had been adopted the meeting considered the Fourteenth Annual Report, which was submitted by the Management Committee. This Report dealt with the efforts that were being made towards obtaining an amendment of the existing method of valuation for assessment of Public Utility Undertakings. In this connection it was hoped that revision would take place at a not unduly distant date. Income-Tax Valuation was considered in some detail; particulars of a claim for obsolescence of plant by a particular gas company were given in full. In this case vertical retorts had been substituted for horizontal retorts and water gas plant. The company contended that the basis of valuation was the cost of the vertical retorts, since they were of " similar nature " and capacity as the horizontals and water gas plant they had replaced. This claim was not upheld by the Assessor, who allowed a sum which represented the present-day value of horizontal retorts and water gas plant. The principle involved in claims of this nature appears to be that allowance must be made on the value to-day of horizontal retorts and water gas plant, since, if the allowance represented the value of the vertical retorts, then the excess of the price of verticals over horizontals, which represents a capital expenditure, would be being allowed as a revenue reduction.

In a case of an appeal to the Local Lands Valuation Appeal Court against the decision of the Assessor to disallow costs of repair to retorts in computation of income-tax, it was agreed that the expenditure on retort repairs be allowed with the exception of the cost of repair of the main arches of the bench.

The Report also dealt with Gas Legislation as affected by the Final Report of the Gas Legislation Committee. The Committee's proposals empower the Board of Trade to make a Special Order conferring statutory powers on certain sized undertakings. The number of undertakings affected in Scotland would be 52.

Gas for commercial and industrial purposes was another subject considered. It was mentioned that at a meeting in Glasgow on April 21, it was decided to form an Industrial Centre in Scotland.

After the Report had been approved, the appointments for the coming year were made.

ELECTION OF OFFICERS.

Chairman.—Sir W. E. Whyte.

Vice-Chairman.—Mr. J. W. McLusky (Glasgow).

Secretary.—Mr. J. W. Napier (Alloa).

Committee.—Mr. George Braidwood (Coatbridge), Mr. James Campbell (Dunfermline), Mr. R. W. Cowie (Hawick), Baillie Gowans (Perth), Mr. George Hamilton (Barrhead), Mr. T. W. Harper (Ayr), Councillor W. F. Harris (Edinburgh), Mr. Ronald D. Keillor (Greenock), Mr. John Lang (Vale of Leven), Mr. Samuel Milne (Aberdeen), Mr. A. S. Nisbet (Paisley), and Mr. H. G. Ritchie (Falkirk).

Representatives on the Central Executive Board.—Messrs. H. G. Ritchie, John Lang, J. W. Napier, and George Braidwood, with Sir W. E. Whyte as Chairman of the District.

ADDRESS

By Mr. S. S. OGILVIE, Joint Manager of the N.G.C.

Mr. Ogilvie said that he had great difficulty this year in selecting a subject as he thought that it was no exaggeration to say that the work reviewed by the Central Executive Board represented the whole gamut of home affairs and home administration in Great Britain. Questions of national importance, such as those relating to Fuel and Transport, were of close concern to gas undertakers. It was a matter of almost daily thought how to develop a policy whereby the Industry could be best organized, with the practical object in view of increasing the output of gas.

With regard to the Coal Mines Act, proposals for the amendment of the same had been framed by the Central Coal Council, but the Districts had failed to agree with the suggestions put forward. At the moment a state of deadlock existed. The Secretary for Mines, in answer to a Question in Parliament, stated that unless coalowners could agree amongst themselves, it would be necessary for the Government to take the necessary steps to ensure co-ordination between District minima prices and the exclusion of export coal from the quota provisions. The National Gas Council could do nothing effective until definite proposals had been made and published. They had pointed out their position to the Mines Department, and had been assured that they would be consulted.

With regard to Transport, Mr. Ogilvie spoke at length in connection with the proposed taxation of road vehicles, and remarked that it was a matter for congratulation that the Government thought sufficiently well of the prospects of gas as a propellant for motor vehicles as to place such vehicles in a special category for the purposes of taxation.

As regards Gas Legislation it was gratifying to find that the Final Report of the Committee had now been completed, and all that was now required was for the Government to give effect to this measure—a happening which would probably take place next session. There would probably be a good deal of criticism in Scotland, but a broad view should be taken, as the Report was a fair one, and should, in the long run, be helpful to the Industry. He thought that, taking the long view, it would be to the benefit of non-statutory companies to become statutory, particularly as the existing statutory requirements would be modified. If the recommendations of the Committee were passed into law, the existing pressure requirements would have to be given effect to by every undertaker, but five years would be allowed to enable them to comply with the same. With the exception of this requirement, non-statutory companies with a make of under 20,000,000 c.ft. would not be compelled to become statutory. Non-statutory Companies with a make of over 20,000,000 c.ft. but less than 30,000.000 could, at the instance of the local authority, be forced to adopt a statutory status if the

local authority could show that the gas supply was unsatisfactory. Non-statutory Companies with a make of over 30,000,000 would become statutory in the fullest sense. Here again time would be allowed. Statutory undertakings gained this advantage, that it would be easier to raise capital as they would enjoy a statutory authority to open highways; they would no longer be merely dependent upon the goodwill of the local authority.

Mr. Ogilvie then indicated the different ways in which existing restrictions were being modified in favour of the Industry.

On the question of Industrial Centres, Mr. Ogilvie said that Development Centres for Industrial Gas had been formed to collect information and provide expert assistance to subscribing undertakings. Birmingham had had such a Centre for a long time and one had been in operation at Newcastle for two years. Cardiff had followed suit, and both the Yorkshire (West Riding) District and the South-Western District were taking the necessary steps immediately to form a Centre. London would do likewise. A Sub-Committee had been formed to consider the establishment of a Centre in Scotland, and from the evidence in other districts he felt sure that the benefits would be greater than estimated. Small undertakings in residential districts did benefit by assistance such as is given by these Centres, because there was always found some industry in which the use of gas had not been considered.

In concluding, Mr. Ogilvie said that it had been a busy and difficult year. Parliament, however, was becoming gas minded; and provided that gas legislation and the co-operation of the gas undertakings were secured, there were great prospects of prosperity in the Industry.

Councillor CATTO thanked Mr. Ogilvie for his address.

Discussion.

Mr. J. BELL (Dumbarton) said that in Scotland to-day they were feeling the effect of adverse world conditions perhaps even more so than other industries, since they had received no benefit from the de-rating scheme. Under Section 2 of the Coal Mines Act, powers were given to raise the value of coal in order to reduce export losses. This, he thought, was a backward action. Coal being sold on the home market at 18s. 6d. per ton was being exported at 12s. per ton f.o.b. This was a serious loss to the coal-owners, but it was hard that gas undertakings should be called upon to subsidize the coal industry in this way. Cheaper home coal would mean cheaper gas, more customers, greater output, and therefore more business for the coal-owners. Mr. Bell felt that unless some taxation relief or reduction in the price of coal could be obtained the price of gas would have to be increased.

Mr. OGILVIE said that the Coal Mines Act was the child of the Ministry of Mines, who were very pleased with it, and would therefore insist on the conditions set out therein. The National Council were trying to prevent them from acting in the way suggested by Mr. Bell; and to help in this direction it was essential to get on friendly terms with the coal-owners. The Treasury could not afford to de-rate public utility undertakings, for to de-rate gas, electricity, and water would cost £7,000,000. In the development of gas sales there seemed to be a chink in the armour. Sufficiently close contact was not maintained with concerns which had ramifications all over the country. In this class he would include Government Departments, Local County Authorities, multiple shops, banks, and railways. As an example, the Office of Works was considered. They were willing to encourage the use of gas, but owing to the general policy of the Department it was necessary that appliances should be installed on the hire system. It was also necessary to keep in close touch with County Authorities as these bodies usually had their own architect who apportioned the work to a selected heating engineer, and the job was sometimes completed without the gas undertaking knowing anything about it.

Mr. A. KELLOCK (Airdrie) asked about the appointment of gas examiners. In his town an examiner had been appointed by the usual course of getting five consumers to petition the Sheriff. All the legal fees had been paid by the Gas Department, and now that the occasion had arisen for the appointment of a new examiner the Gas Department did not intend to pay the costs. He thought that the legislation should be amended to give County Councils power to elect a new examiner once one had been appointed by the usual method.

Mr. OGILVIE said that the gas examiner was merely a watch dog to guard the interests of the consumers, and where the gas undertaking was controlled by the local Council he saw no reason why they should not have power to appoint this official.

Mr. JOHN WILSON (Dundee) said that with regard to the proposed consolidation of Burgh Funds it would be the rating and not the revenue producing branches which would benefit. Treasurers were pushing this scheme in order to gain the advantage of losses on individual branches by saving the cost of taxation on the profits of the others. Then gas or electrical undertakings would have to pay losses on the rating department.

Mr. OGILVIE summed up the position with regard to the tax on oil as satisfactory.

The CHAIRMAN said that they were indebted to Mr. Ogilvie for a most profitable afternoon.

Mr. BELL (Dumbarton) proposed a vote of thanks to Councillor Catto for guiding the proceedings of the meeting so successfully.

The Leeds Industrial Gas Section

In the course of the meeting of the Manchester District Association of Gas Engineers, held at Leeds on May 19, the members were enabled to make an inspection of the special Industrial Gas Section of the Leeds Gas Department—a section which of late years has been very greatly developed.

The visit was of special interest in view of the important part Leeds is to play in the scheme of the National Bodies for the development of gas for industrial purposes. In Leeds, which is one of the two Yorkshire centres (the other being Sheffield) under the scheme, gas is used for something like 800 industrial processes. Mr. E. A. Leask, who contributed a valuable paper to the meeting of the Manchester Association on the "Design and Operation of Industrial Gas Appliances," is in charge of this section of the Leeds Undertaking.

At the demonstration rooms at the Dewsbury Road Gas-Works the visitors were shown a comprehensive display of furnaces and other appliances and a wide range of gas-heated equipment for hotels, restaurants, cafés, &c., in the room set apart for the catering trade, together with small appliances such as tailors' and wholesale clothing trade pressing irons, &c.

The furnace room is equipped with a series of three pipes for low and high pressure gas and air blast, connecting to the various furnaces as required. The first apparatus seen was a Revergen recuperative furnace for case-hardening, annealing, normalizing, &c., for the engineering trades, working on low-pressure gas and low-pressure air from a fan, the air supplied picking up the waste heat from the brickwork. Next was a twin-chambered rivet furnace, working on gas and air blast at a temperature of 1000° C., chiefly intended for the boiler and tank making industries. A rivet furnace of similar character, but with hopper feed direct into the heat was also noted. The visitors were then shown an air-blast furnace for hardening high-speed steel tools, essential in the modern tool-making shop and for tool-hardening in engineering works generally; and an air-blast oven furnace working on the surface combustion principle, the gas being at town pressure and air from a low-pressure fan.

Leeds has an extensive brick and firebrick industry, and the latest type of furnace was seen for testing the melting point of bricks; in this furnace an entire brick is tested instead of only part, as formerly. The furnace reaches a temperature of 1700° C., which is the highest temperature of any furnace in the room. It is lined with the Lefsil brick, a special heat-resisting production of exceptionally high quality. This is also a gas and air blast furnace. An ante-room is devoted more especially to metal melting furnaces for brass foundries, printers' type works, &c., and equipment for these purposes both of the crucible and the large tilting type was seen.

In the same room is a small example of a central heating boiler connected up for testing purposes, to ascertain the proportion of heat in the gas which is actually transferred to the water in the boiler. This boiler has proved itself to give up to 80% efficiency, but the Department prefer to keep it not higher than 75%, sacrificing the extra 5% possible for the sake of giving a service absolutely free of any condensation trouble. This boiler has thermostatic control, and is a small replica of boilers supplied for central heating of large buildings by gas—in respect of which the Leeds Gas Department have lately achieved a notable triumph in the heating of the new Civic Building to be opened by the King a few weeks hence.

CONFECTIONERY BOILER.

Passing by a series of small hardening furnaces of various designs and aimed at various particular uses, the visitors were shown a gas-heated sugar boiler for manufacturing confectioners, the heating in this case being by natural draught. The boiler frame is fitted with a nest of rings to carry boiling pans of varied sizes.

Returning to the main furnace room, the party saw a combined brazing hearth, hardening furnace, and blower all

complete in one unit. Close to this an exhibit in which the visitors took very special interest was that of a brazing hearth on which high-pressure gas plays vertically downward on to the coke surface from a nozzle some 12 in. above. After a brief start in the ordinary way the flame jumps the 12 in. space completely, and one's hand may be passed without harm between the nozzle and the heat playing on the coke.

From here the visitors moved to an oil-tempering furnace, complete with interior thermometer in wire basket for easy removal. Passing to the muffle furnaces, they were shown one with the gas burners outside the muffle, this being specially useful for delicate processes such, for instance, as pottery and glassware, in respect of which the products of combustion might be harmful and must be kept away. During the visit several of the appliances on view were in operation, and the Association were able to see the entire process of case-hardening, consisting of carburizing a number of spindles, showing the method of packing in heat-resisting boxes with carburizing compound. Down the centre of the room is an assortment of high-pressure gas burners suitable for tank-heating and melting furnaces. One which aroused more than usual interest is divided into sections of refractory material to give off radiant heat. Before leaving the furnace rooms the members examined the gas engine which provides motive for driving the compressors; large high and low pressure meters for measuring the consumption of any appliance in use; and pyrometers for testing the temperature at the same time.

Gas Driven Wagon.

At the time of the visit there was present in the yard a gas-driven wagon from the Whitwood Colliery Company, which the visitors inspected with much interest. This wagon has six cylinders of gas at a pressure of 3000 lbs. per sq.in. It has an average range of 60 miles fully loaded, and can be re-charged from the filling station in from three to five minutes.

In the exhibition of catering appliances were seen large baking and roasting ovens, including a portable baking oven suitable either for a hotel or bakery. Having in mind the trade risks of difficult times like the present, and the fact that many starting or extending business may be tempted to skimp the equipment rather than risk sinking a lot of money in the fixing of thoroughly efficient plant, the Department have developed the offer of portable equipment. Included in this system is a portable sheet steel restaurant oven which can be dismantled in a very short time, transferred to some other place or other user, and re-assembled for use within a few hours.

Much interest was evinced in gas-heated tailoring irons, from a new type gas iron for the tailor in a small way of business to internally-heated pressing irons as used in big Leeds wholesale clothing factories. The weight of these irons is from 16 to 18 lbs. Another interesting exhibit is the gas-heated automatic glue pot, in which the gas valve shuts off when the glue is fully melted, leaving only the by-pass burning. A general assortment of brazing equipment includes blowpipes and foot-worked air bellows; automatic soldering irons, in which the placing of the iron in the stove turns on the heat; and a little gold melting furnace for the jewellery trade.

Finally the visitors saw the clock control apparatus as now supplied for central heating and various industrial processes, by which the appliances can be set at night so that the gas will be automatically turned on in the morning in sufficient time before arrival of the workpeople for an immediate working start to be made. There are two types of these clocks—one which automatically starts the heating but leaves the shutting down to be done by human agency at night; and the other which both starts and cuts off automatically at set times. Both forms of clock miss working on Sunday, re-starting themselves on Monday morning. The Leeds Gas Department are doing very good business in these clocks for various industrial works. The clocks are kept in stock at the Dewsbury Road Industrial Gas Department, together with a supply of spare parts for all kinds of equipment, burners, fire-bricks, &c.

A Birmingham Gas Department Exhibit

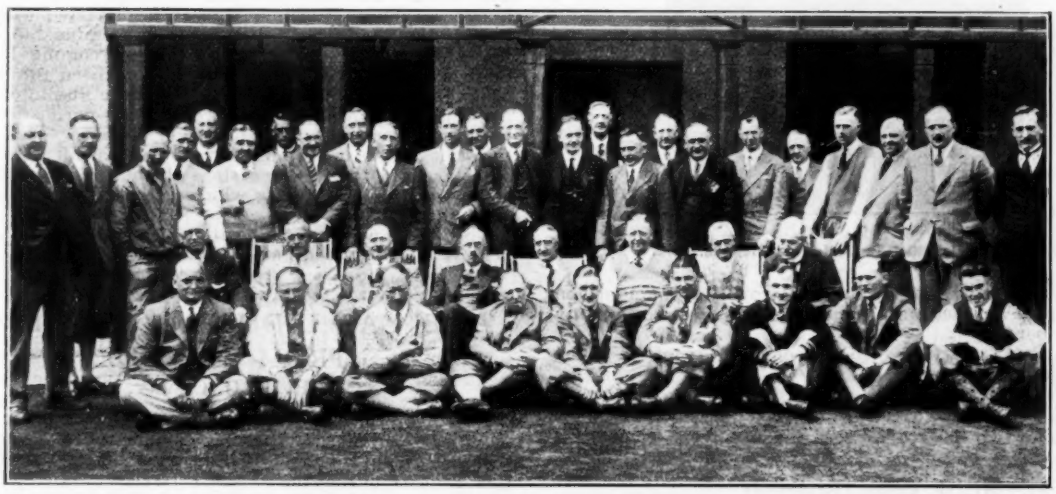
The City of Birmingham Gas Department exhibited as in former years at the National Trades Exhibition, Bingley Hall, which recently concluded an eight weeks' run. On this occasion, half the stand space was occupied by an erection in the form of four bays which were fitted with suitable gas apparatus and furnished as dining, bed and bath rooms, and a kitchen. Water heating received particular attention, the "Ottawa" storage heater, "Treasure" geyser, and "K.C.U." sink heater being displayed, and an increased amount of business in this direction was reported. A "Panella" fire with marble surround and a "Curvex" fire in gold finish completed really attractive layouts in their respective bays. The remainder of the stand space was of the open style and was fitted with a variety of domestic gas appliances. Occupying a central position, it is not surprising that the exhibit attracted considerable attention from visitors.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

Wales and Monmouthshire Association of Gas Engineers and Managers

Annual General Meeting at Abertillery, May 18



A WALES AND MONMOUTHSHIRE ASSOCIATION GROUP AT NEWPORT.

The Annual Meeting of the Association was held at the Bush Hotel, Abertillery—Mr. IFOR G. JENKINS, Engineer and Manager of the Abertillery Urban District Council Gas Undertaking (the President), in the chair.

Councillor J. HILLIER, J.P., the Chairman of the Abertillery Urban Council, at the opening of the proceedings, offered a hearty welcome to the Association. He remarked that this was the first occasion on which such a meeting had been held there, and they all appreciated the visit very much. By electing their Engineer and Manager, Mr. Jenkins, to the important office of President, the Association had paid a high compliment to him and to the town and its gas undertaking. Naturally, they were very proud of their gas undertaking, and endeavoured to give real service to the consumers. During the year ended March 31 last, 8040 tons of coal were purchased by the Department for all purposes, and the whole of this quantity was produced in their own town, and hauled direct to the gas-works from the colliery. During the past ten years the undertaking had made good progress, and notwithstanding industrial depression and electrical development, they had been able to increase their sales. They possessed an up-to-date showroom, and he considered this one of their best advertisements.

Councillor J. E. DAY, Chairman of the Gas Committee, joined in welcoming the members, and said that the election of Mr. Jenkins to the Presidency of the Association was gratifying to the whole of the Gas Committee, and they were sure that the Association received from him the same excellent services that he had rendered to the Abertillery gas undertaking over a period of 22 years.

The PRESIDENT, on behalf of the members, having briefly acknowledged the welcome,

The HON. SECRETARY (Mr. Octavius Thomas) read the minutes of the last meeting, and they were confirmed. He went on to announce the receipt of a number of letters of apology for absence, including one from Mr. Leonard Langford (Tunbridge Wells), who at one time occupied the position which their President now holds. Mr. Langford wrote: "I much appreciate the kind invitation received from my old friend and your President, Mr. Jenkins, to your Annual Meeting, but unfortunately the date clashes with another engagement. I am exceedingly proud that Mr. Jenkins occupies the honoured position of President of the Wales and Monmouthshire Association. I remember my first meeting with him many years ago, when he was appointed to my staff at Abertillery, and I was indeed extremely fortunate in getting such a conscientious and hard working young man. He deserves success, and has obtained it in no small measure."

THE ASSOCIATION ROLL.

The following additions were made to the Roll of the Association:

NEW MEMBERS.

Frederick Allen, B.Sc., Engineer, Manager, and Secretary, Carmarthen Gas Company.
H. J. Herrera, Manager, Risca Council Gas Department.
A. R. Minchington, Manager, Tondu Gas-Works.
E. H. Hart, Assistant Engineer and Manager, Merthyr Tydfil Gas Company.

TRANSFERRED FROM STUDENT TO MEMBER.

T. H. Madden.

ASSOCIATES.

F. W. Bailey, London (J. & J. Braddock, Ltd.).
J. H. F. Watson, Birmingham (S. Flavel & Co., Ltd.).
A. C. Hall, London (W. Parkinson & Co., Ltd.).
Francis D. Drake, Halifax (Drakes Ltd.).
Walter Hoe, Solihull (Arden Hill & Co., Ltd.).
G. H. Elliott, Gloucester (Newton, Chambers, & Co., Ltd.).
A. W. Nicholas, Cardiff (Cannon Ironfoundries, Ltd.).
J. Parkinson, Jun., Cardiff (W. H. Dean & Son, Ltd.).

REPORT AND ACCOUNTS.

The 28th Annual Report stated that the Roll at the end of the year was 69 members, 4 honorary members, 6

students, and 35 associates. The receipts for the year amounted to £111 16s. 6d., and the payments to £104 0s. 11d., leaving, with the balance brought forward, the sum of £18 4s. 7d. in the hands of the Treasurer, with £100 of 2½% Consols. The report added: "The Council wish to draw the attention of members to the industrial showroom and laboratory provided by the Cardiff Gas Light and Coke Company, and to express the hope that as many undertakings as possible will join to support the scheme."

The President (left) and Sir John Beynon, Bart.

Mr. H. MATTERFACE (Monmouth), proposing the adoption of the report and accounts, said it was good to see so many new members.

Mr. H. SUTCLIFFE (Gowerton) seconded the motion, which was carried unanimously.

NEW OFFICERS.

The following officers for the ensuing year were then elected:

President.—Mr. W. Collin (Bridgend).
Vice-President.—Mr. J. Stephenson (Aberdare).
New Members of Council.—Messrs. D. Muir (Pontypridd) and B. J. Bell (Cardiff).
Treasurer.—Mr. J. H. Canning (Newport).
Hon. Secretary.—Mr. Octavius Thomas (Pentre).
Auditors.—Messrs. L. W. Nuttall (Pembroke Dock) and J. Robb (Chepstow).

Mr. JENKINS, proposing the election of Mr. Collin as President, said that gentleman was well known to them all, and had had a long and varied experience in gas engineering, not only in this country, but also abroad.

Mr. W. H. JOHNS (Swansea) seconded the resolution, which was heartily carried.

Mr. J. E. KENSHOLE (Merthyr) proposed Mr. Stephenson as Vice-President, pointing out that he had taken a very active part in the work of the Association.

Proposed by Mr. OCTAVIUS THOMAS, and seconded by Mr. B. GRAINGER (Caerphilly), it was resolved to subscribe £10 10s. to the Benevolent Fund of the Institution of Gas Engineers. Mr. Thomas announced that he had also received between £10 and £11 as the result of the previous day's golf.

PRESIDENTIAL ADDRESS.

Mr. JENKINS then delivered his Presidential Address, as reproduced on pp. 549-53 of last week's "JOURNAL." At its conclusion,

Mr. J. H. CANNING proposed a hearty vote of thanks to the President. He said they had listened to an inspiring address, which was full of hope for the future. Remarkable success had been achieved by Mr. Jenkins in Abertillery, in spite of the very unfavourable conditions which naturally attached to the development of gas sales in a colliery district. They had cheap coal and a not very wealthy population, so that even without electrical competition they would not have the best of conditions, but Mr. Jenkins was also faced with competition from electricity, which had had an effect, though not a permanent one. After a temporary shock, gas had shown its vitality by going ahead again. It must be a great pleasure to any gas engineer to look at the charts accompanying the address, because they all tended in the right direction. The gap between make and sales was gradually diminishing. The price showed a progressive decrease, and altogether it was a record on which the President was to be heartily congratulated. The Council and Gas Committee were also to be congratulated, because they had supported Mr. Jenkins. They had spent money on their works, and kept them in good condition. Unfortunately, many Councils did not possess either the courage or the foresight to do this.

Mr. W. CLARK JACKSON (Neath) said it was a great pleasure to him to second the vote, because he had for a number of years been a close friend of the President. Mr. Jenkins had, by the figures in the address, proved his capacity as an administrator. The results showed that he had paid great attention to extension work, and no money had been spent unwisely. The President had made a special point of the service which his undertaking was rendering—giving, as he did, a gas of standard calorific value, adequate pressure, and a trouble-free gas in so far as it contained neither naphthalene nor moisture, and therefore enabled consumers to enjoy a supply without any difficulty from stoppages. With his maintenance arrangements, these things did give a service to the community which all of them ought to endeavour to furnish. The President had made reference to the setting-up of the Industrial Research Station at Cardiff in October last. This Centre had now reached the stage when there were fourteen contributing members. They started with eight, so that they had nearly doubled their membership in these few months. The reports which were coming from the Centre had been excellent, and he had been informed by other Industrial Centres that they were in absolutely model form, and that other Centres were asking permission to use the same form in getting out their reports. This showed that they were being ably led by the Cardiff Centre. He (Mr. Jackson) would suggest as strongly as he could that there was no undertaking which could afford to be outside the Centre.

The vote was carried with acclamation, and briefly acknowledged by the PRESIDENT.

The following paper was then read:

THE GAS INDUSTRY AS VIEWED FROM OUTSIDE.

By E. H. CLARRY.

Last year this Association took advantage of its change of title to admit as Associate Members, commercial and technical men engaged in industries closely allied to the Gas Industry, and the *raison d'être* of this step was obviously to extend the usefulness of the Association by combining the knowledge, opinions, and experience of those directly engaged in the Industry with the knowledge,

Visiting the Ebbw Vale Company's Works.

opinions, and experience of those who serve the Industry indirectly.

As most of you are aware, I have had the honour of being a full member of the Association for many years, and for a long time I was intimately and actively engaged in both the production and distribution of gas, while for some few years past I have been engaged in activities which are closely associated with the Industry.

It was possibly, therefore, because of the combination of

these circumstances that it was suggested it would be appropriate for me, on this first anniversary of the admission of " outside " men as Associates, to give you a few of the impressions of the Industry which have come to me while moving among you in my new rôle.

In the first place I think one of the things which forcibly strikes anyone who is making regular visits to gas-works is the high standard on which the works are planned and maintained. This applies not only to the large works but also to the small. In regard to the latter, one is also impressed by the enthusiasm and ingenuity shown to provide a constant and efficient gas service at the lowest possible cost. It is, however, equally obvious that, despite this enthusiasm and ingenuity, the majority of these small works are struggling against such serious handicaps as low outputs, and they are seriously threatened by competition, also geographical isolation which results in high transport charges and a restricted market.

Amalgamations.

Take the last handicap mentioned—*i.e.*, geographical isolation. It is encouraging to see that this problem has been fully investigated in the final report of the Gas Legislation Committee, wherein is recommended legislation to empower Undertakings to:

(1) Work jointly or collectively—that is to say, when physical amalgamation of absorption is not practical, an arrangement would exist for pooling interests, collective purchasing, &c., in such a manner as is now carried on by the British Gas Light Company, Ltd.

(2) Group of undertakings territorially—that is where a financial interest in, or complete absorption and control of, a group of undertakings is effected such as the South-Eastern Gas Corporation, who now control, financially and otherwise, seven gas undertakings and cover an area of approximately 360 square miles. In this case all the undertakings are contiguous except for a few miles separating the area of the Maidstone Gas Company from that of the East Kent Gas Company. This amalgamation and many other absorptions by the Sheffield, Bristol, Cheltenham, Oxford, Bath, and many other gas companies happily shows that the need for a combined front against all competitors is now fully realized.

At the moment all groupings and amalgamations must be quite voluntary, but to prevent a block between two or more assenting parties arising from other dissentients or where the area is non-contiguous the Board of Trade may empower by special order the laying of connecting mains through the area of the dissentients. Other industries when considering amalgamations and groupings have wider allied interests in both the raw material and the disposal of its commodities than the Gas Industry. Locally we have the steel industry who have a financial interest in raw material by being owners of collieries and are financially interested in tinplate and sheet works who take their finished bar. Under this heading the only amalgamation the Gas Industry can make is one of goodwill with their customers who take the gas and coke.

The Customer.

Owing to severe competition all round, the time is past when any gas undertaking can complacently sit down and say we have laid a supply of gas to your doorstep, take it or leave it. Owing to its old establishment, fixity of business methods, and lack of early competition from outside, it may have been so once upon a time. However, progress has been steady and it was not until fairly recently that competition quickened the Gas Industry's activities. Criticism has been levelled at the Gas Industry, in common with all others, but nothing the Industry could have done would have prevented the advent of electricity and its subsequent development—development which should have been in conjunction with the Gas Industry.

As time progresses, different avenues to give satisfaction to the customer have been explored. First, there was the showroom, then the hire purchase of fittings, cookers, &c., and in this department some Gas Companies looked upon these sales as a source of revenue instead of a means of giving utilization service. As gas (except through special appliances) is not a self-contained selling commodity, and although gas undertakings are primarily organized for the purpose of selling gas, actually it is not the gaseous commodity which the customer buys but the service in the form of heat, light, and power. Perhaps the importance of the Gas Industry to the coalfields and as a great national asset has not been sufficiently stressed to the customer, causing a lack of his sympathetic support; and if more could be done on these lines no doubt benefits would accrue.

Standardization of Calorific Value and Pressures.

Would it not be possible to have a gas of a standardized calorific value throughout the country so that a customer who lives in " A " but buys a fitting in " B," or who moves house from one locality to another taking with him his cooker, wash-boiler, &c., could be saved the disagreeable necessity of having his appliances re-adjusted to meet the changed calorific values? Take again the cook and the housemaid (for ever changing from one house to another), they never get absolute efficiency owing to the continually varying conditions. Consequently, the gas may be unjustly blamed and discontent matures.

The importance of calorific value is almost outweighed by the question of standardized pressures. I am aware that there is a minimum standard pressure specified, but it is obvious to anyone connected with an undertaking that there are considerable variations in pressure supplied to different parts of the area of the same undertaking and in the same area at varying times throughout the day.

Modern appliances have been designed to work within very narrow limits to give the best combustion results and it is obvious that a variation of twenty-tenths and even more cannot be looked upon with equanimity.

There has been a tendency to develop the thermostatic control of gas appliances, but it is a moot point whether a standardized pressure throughout the district combined with adequate pipes should not be secured by governing. I do not attempt to dogmatize in saying where this should be done, it may be at the meter or the appliances, but its necessity is obvious.

In this connection it is quite clear that the maintenance of an adequate pressure is pre-supposed. Until such conditions prevail, lighting burners particularly should be selected for ease of adjustment—because making such an adjustment with a burner in use is definitely painful.

Standardization of Fittings.

In a similar way the remarks concerning calorific value apply to fittings. A burner and globe are purchased; the globe is broken, and great difficulty is experienced in replacing the same owing (in some instances) to the original supplier not stocking that particular burner owing to small demand or having run out of stock. The same applies to a cooker or wash-boiler fitting or connection. If in some way these appliances could be classified and agreements reached by groups of undertakings in specified localities to stock only these, then the goodwill of the customer would be considerably enhanced.

Cleaning and Regulation.

If for a small quarterly charge (or more preferably for no charge at all) the customer could be regularly visited—say, every three months—and his fittings cleaned and adjusted and renewals made where necessary (the cost of renewal would, of course, be borne by the customer), I feel that more use would be made of the appliances, and, in consequence, more gas would be consumed.

Potential Markets.

The future development of the Gas Industry is undoubtedly bulk supply. For instance, if a central heating load could be developed it would at least double the output of the Industry within a few years. In this connection it is necessary to make the architect, builder, and customer gas-minded. Could not the convenience, neatness, and cheapness of this method of heating be continually brought to their notice? It is every gas undertaking's duty to segregate and analyze all the potential heat-consuming customers and ascertain which are burning raw coal and what it is costing in this or that area, and how much is being used; then point out the advantages of gas for heating purposes, showing how by this method they will save money. Some potential customers use anthracite or oil stoves. What would these work out at? Would it not be possible to approach such users with an alternative scheme for gas heating? Electricity in this or that area costs so much, if the customer uses a large quantity it costs less in increasing ratios. How can this market be captured at the gas undertaking's current price for gas?

Methods of Charging.

I am aware that there is a controversy at the present moment on the method of charging. We have two-part, three-part, and four-part tariffs, block and special systems depending on local conditions, including the charge by unit. All these involve a definite fixing of price according to some peculiar method applicable to the district. As a trader I am aware that prices *must be flexible* in order to meet competition. Whereas with a schedule issued by an

authoritative undertaking the prices stated must be applicable under every condition and no variation is possible.

It may be, that certain desirable loads are at present obtained at the scheduled price, but conditions arise where that price is no longer economical to the consumer and some other fuel must be utilized. The position is now entirely altered as the adherence to the schedule means that this particular section of business must be lost, and it is a matter that I suggest requires very serious consideration. To lose an existing load through a fixity of procedure is not good business.

There is one thing which has occurred to me which might be a point worth visualizing. When the prepayment meter was first introduced it was for the convenience of a class of consumer who had not hitherto availed themselves of a gas supply. For a long time this condition continued, but I venture to suggest that the policy of at least showing bias in favour of ordinary meters is capable of being questioned. No longer do consumers consider it derogatory to confess that they prepay for the commodity that they use. It is admitted there are certain difficulties such as the cutting off at the prepayment meter while certain appliances are in use, but experience has proved these are negligible.

Taking into account the fact that such consumers are easiest to handle, why not develop the use of a prepayment idea, which would prevent complaints of account and many other difficulties? I am aware that where full installations are fitted they have to be paid for, but I am suggesting that the only provision required is that of meter rent, and, therefore, such consumers providing their own appliances could easily have a prepayment meter fitted of adequate size to deal with the potential load to the convenience of the Company and to the advantage of gas consumption.

In Conclusion.

Where there is a possibility of improvement or development there also exists that stimulus to obtain perfection, and as gas is essential to humanity from the time it heats our first bottle to the time when we pass into the crematorium, the Industry must strive to obtain its ideal to its own satisfaction and to that of its customers.

Discussion.

The President said it would be necessary to consider more generally some form of amalgamation as the years went by, in order to compete with the electricity grid scheme.

Mr. J. H. Canning said the points raised in the paper would give them a great deal to think about. The author was in favour apparently of the standardization of apparatus, in order, he presumed, to do away with the necessity of adjustment; but there might be circumstances compelling a gas undertaking to change its calorific value, in which case the adjustability of apparatus would be a great advantage. On the other hand, things did get out of adjustment from various causes, and gas undertakings were subjected to a good deal of unmerited blame on this account. Then Mr. Clarry had suggested that they should get in touch with architects, builders, and other people connected with the putting up of houses, with the view of getting them interested in gas. In this connection, the question of the fixing of wash boilers in houses arose. The old type of coal-fired wash boiler was rather costly, and the introduction of the gas wash boiler had considerably reduced the outlay. But builders, with a view to still further economizing, were in some cases putting in exceedingly cheap and trashy appliances. He (Mr. Canning) had felt very strongly that representation should be made to architects to induce them to specify a really good, durable type of apparatus. In a great many houses in his own district where these cheap boilers had been put in he felt certain that trouble would occur in a few years, and the result might possibly be loss of consumption. Method of charging was a matter in which he was particularly interested, and when a couple of years ago he was in Canada and the United States, where there were in operation very ingenious methods of charge, he found a great difference of opinion as regarded the two-part tariff and the block system, which were the systems mainly in use there. The block system one could understand immediately, but the two-part tariff was more difficult to comprehend. The latter was, however, the same system as that on which telephone charges were based, and if this fact were explained most of the difficulty would be removed. In any event, in the interests of the consumers themselves, the Gas Industry must have more freedom in this matter than it at present enjoyed. In Canada prepayment consumers were few—there were none in Toronto, and a very small number elsewhere. They had all monthly accounts, and this was a matter which might be more generally considered in this country. Monthly accounts might frequently lead to a higher consumption than was experienced under the present system of quarterly accounts. Finally, he expressed the hope that Mr. Clarry's example in reading this paper would be followed by many of those who had recently been admitted as Associates of the Association.

Mr. J. E. Kenshole thought there was no doubt that amalgamations in certain cases in South Wales were very desirable, but there was a danger one had to try to avoid. They must be careful not to go too far. In other industries in South Wales they had seen cases in which this policy had got rather out of hand. Where a very efficient undertaking had been taken into a group it had occasionally happened that, instead of the efficiency being maintained and the other concerns being brought up to its level, the efficient one had been brought down to the level of the inefficient members of the group, and thus no gain had resulted. Mergings might get so large that they could not be properly controlled. If they were going to standardize the calorific value all over the country, would they not be doing away with the benefit of the Gas Regulation Act, which gave each undertaking the power to declare the best calorific power for its own particular purpose? If this was a correct view, would standardization throughout the country not be a retrograde step?

Mr. W. Clark Jackson pointed to the advantages of standardization of appliances by each individual undertaking for its own purposes. Stocking appliances of many different types necessitated the maintenance men carrying about numbers of different classes of fittings. For example, although he did buy lighting burners from several different firms, he insisted on a standard nozzle, so that the men going round had only one nozzle to deal with. Though there was certainly a great future for the Gas Industry, it must never be forgotten that they must now go out and apply themselves to getting business. They must be determined to give the best possible service to their customers.

Mr. H. D. Madden proposed a hearty vote of thanks to the author for his paper. Mr. Clarry, he said, was with him for a long time before he went into commerce, and since he had been away from the Gas Industry he had had an opportunity of becoming more closely acquainted with the coal, iron, and steel industries. Thus he had seen things from an outside point of view. Every gas undertaking must make service the forefront of its business. In this connection, he had been greatly interested in the advertisement of the South Metropolitan Gas Company, which appeared on page 427 of the "Gas Journal" of the previous day's date. This advertisement, which invited applications for the position of Assistant Gas Sales Manager to the Company, offered a commencing salary of £2000 per annum, and it gave a very good lead to the Gas Industry in the direction of raising the status of this side of the Industry. By this advertisement the South Metropolitan Gas Company had definitely emphasized the importance of gas salesmanship. As to standardizing calorific value, he was not in favour of this, but all undertakings should pay very great attention to their specific gravity. If this was kept to a straight line, half the trouble with regard to fittings would be done away with. As to joint working, he might say that what had been done with regard to tackling the industrial gas problem in South Wales had shown him how great was the help which one undertaking could give to another.

Mr. J. Prosser Jones seconded the vote of thanks, which was acknowledged by Mr. Clarry.

Luncheon.

It having been decided that the place of the next meeting should be left to the Council, the members adjourned to luncheon, after which there were one or two short speeches.

The toast of "The Abertillery Urban District Council" was submitted by Mr. H. D. Madden, who said they had heard that morning of the very progressive policy of the Council. He believed the trade depression was moving away, and he hoped that brighter times were in store for the district. Responding, Councillor J. Hillier remarked that the Council had one Committee to attend to both electricity and gas. [A Voice: "Quite right."]

Mr. J. H. Canning, proposing "The Ebbw Vale Steel, Iron, and Coal Company," pointed out that this was a toast to the greatest industrial enterprise in Monmouthshire. They were honoured by the presence with them that day of Sir John Beynon, Bart., C.B.E., the Managing Director of the Ebbw Vale Company, and they were also delighted to have with them the General Manager, Mr. T. Mort. Sir John Beynon, replying, said it was his pleasure to know Mr. Canning, as it had also been to know his father; and he thought the Newport Gas Company should count themselves fortunate in having so distinguished a gas engineer to succeed a father whose name was a household word in South Wales. In the past the iron and steel departments of the Ebbw Vale Company had consumed more than a million tons of coal a year; and unfortunately they had not yet succeeded in finding a fresh market for the whole of this quantity. Mr. Mort, who was also called upon to respond, congratulated the President upon the position he was occupying, and said the Association were fortunate in their Hon. Secretary. He had known Mr. Thomas for nearly thirty years, and however much he might do for engineers, it was not more than he did for the people among whom he lived.

The toast of "The Association" was in the hands of Mr. J. Day, who spoke of the advantageous manner in which Mr. Jenkins manages the Abertillery gas undertaking. The President, in his reply, agreed that much of the success of the Association had been due to the untiring efforts of their loyal and energetic Secretary, Mr. Octavius Thomas, who had held office for 28 years—ever since the Association was formed in 1905. They were also particularly proud of the fact that two of their members were Past-Presidents of the

Institution of Gas Engineers—Mr. Madden and Mr. Canning. He thanked Mr. Hillier, Mr. Day, and the members of his Council and Committee for their loyal support throughout the twelve years during which he had had control of the gas undertaking.

The Ebbw Vale Works.

The afternoon was devoted to an inspection of some of the most important sections of the Ebbw Vale Company's works. A start was made with the coal cleaning and sizing plant at South Celynen, which is of a capacity of 300 tons per hour. This was opened last year, and so is one of the most modern plants of its kind. The plant is British in every detail of design and material. It was designed, manufactured, and erected by Nortons (Tividale), Ltd., of Hecla Works, Tipton. Following a visit to the Celynen North Colliery pithead baths, some time was spent in the sheet mills, which proved to be of special interest to the visitors, inasmuch as practically the whole of this modern equipment is using large quantities of coke oven gas for heat treatment. Next came the generating station, which supplies electrical energy for the various groups of collieries, and also furnishes Ebbw Vale and Abertillery with current for domestic use. There is also a fine bye-product installation, with complete benzole and sulphuric acid plants.

On arrival at the Ebbw Vale Welfare Pavilion, tea was provided, and then the President expressed the thanks of all present to Sir John Beynon, Mr. Trevor Mort, and the Directors of the Company for the kindness and hospitality they had received, and for the opportunity afforded them to inspect the up-to-date plant at Ebbw Vale. The attention given to the welfare side had been noted with pleasure.

Golf Competition.

On the day preceding the meeting the Upjohn Cup was played for on the links of the Tredegar Park Golf Club; the competition being organized by Mr. Joe Sadler, of the Parkinson Stove Company. The result was as follows:

Col. O. B. Planck	85–14=71
E. S. Allen	83–11=72
J. Sadler	91–17=74
F. W. Richmond	81– 5=76
B. Grainger	97–19=78
C. L. Bury	97–18=79
H. Stephens	96–16=80
F. D. Drake	100–20=80

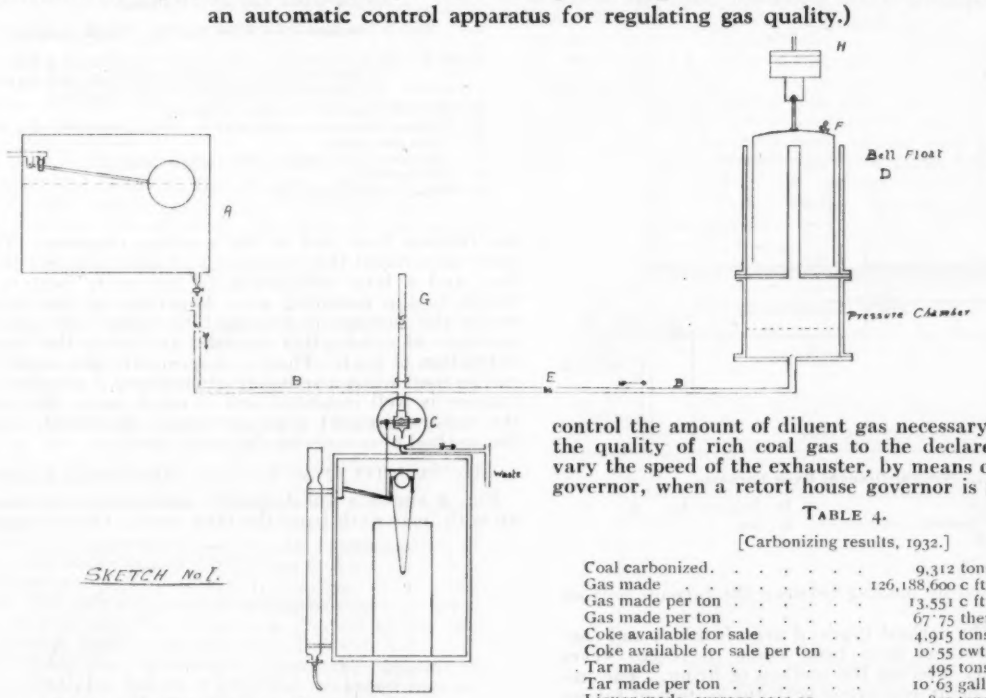
The customary dinner took place in the evening, and about fifty took part in an evening the enjoyment of which was greatly enhanced by well selected items of recitation and music kindly contributed by Miss Muriel Sadler (elocutionist), Mr. A. H. Corn, Mr. C. Edmunds, and Mr. Languard.

Control and Working of Gas-Works Plant*

By H. Goodier and A. G. Saunders, Runcorn.

[*Concluded from p.* 554 *of the* "Journal" *for May* 24.]

(As stated in the "Journal" last week, we are now publishing the authors' illustrated description of an automatic control apparatus for regulating gas quality.)



Automatic Control of Quality.

From Table 4 it will be observed that the working results, under the foregoing conditions, gave a considerable improvement in manufacture, so it was decided to try to control the quality of the gas automatically by the following apparatus fitted to the "Sigma" recorder (see fig. 1).

Water is fed from a constant level tank A at a predetermined rate into pipe B and released to waste by the control valve C. This is operated by the lever arm of the "Sigma" recorder in such a manner that when the quality of the gas is under 500 B.Th.U. the valve closes, causing the excess water to flow by means of the ½-in. pipe B to the pressure chamber of the bell float D, the pressure exerted raising the bell and so closing the retort house governor. On the other hand, as the quality increases to 500 B.Th.U. or over, the control valve is opened, when more water will escape than is fed to it, allowing a little to run out of the pressure chamber to open the retort house governor until the quality falls to the normal. This instrument may also be used to control the amount of diluent gas necessary to bring down the quality of rich coal gas to the declared value, or to vary the speed of the exhauster, by means of the hydraulic governor, when a retort house governor is not installed.

Table 4.

[Carbonizing results, 1932.]

Coal carbonized	9,312 tons
Gas made	126,188,600 c ft.
Gas made per ton	13,551 c ft.
Gas made per ton	67·75 therms per ton of coal
Coke available for sale	4,915 tons
Coke available for sale per ton	10·55 cwt.
Tar made	495 tons
Tar made per ton	10·63 galls.
Liquor made, average 13·5 oz.	840 tons
Liquor made, average 19·0 oz.	1,130 tons
Liquor made per ton	26·70 galls.

Operation.—The instrument is set into operation as follows. The water is turned on at about 3 gallons per hour with the calorimeter on the delivery—*i.e.*, registering the declared calorific value. The control valve rod is then adjusted to such a length that the quantity of water flowing is sufficient to maintain a constant level at 5 in. in the sight glass G with tap E closed. Tap F on the pressure bell is then opened and the weights on the counterpoise H adjusted to give the necessary vacuum of about 10 to 15 hundredths of an inch. Tap E is now opened to allow the water to flow into the pressure chamber, and more water is poured into it, via the sight glass, until it shows that there is 5 in. in the chamber. Tap F is now closed and the calorimeter changed-over to the gas make, when any variation in quality will be automatically controlled. As this apparatus has only been in operation a few days it is too early to give any figures as regards the difference in make, but from the quantity made per day a considerable increase is anticipated.

* From a paper before the Manchester and District Junior Gas Association, May 6, 1933.

Design and Operation of Industrial Gas Appliances*

By E. A. Leask, Leeds Corporation Gas Department.

Fig. 1 shows a furnace of a portable type, strongly constructed of cast and wrought iron framework, lined with firebrick throughout. The base of the furnace is formed of fireclay tiles arranged for the natural-draught system of firing. A cast-iron trivet shelf is fitted to the front of the furnace at floor level to facilitate the handling of the material. The doors, which are firebrick lined, are provided with inspection holes. The flue outlet is provided with a sliding damper. Each burner is separately controlled by a gas tap and air adjuster.

From the cross-section you will observe that gas at ordinary town pressure enters the burner tube from the gas rail E, accompanied by primary air through the port D. The mixture proceeds to the combustion chamber B, which is immediately under the floor of the working space A. Secondary air is admitted to the combustion chamber through the brickwork from the chamber C, which is controlled by sliding dampers on the front of the furnace. The gas burns in the combustion chamber and the working space, and the furnace is evenly heated. After the furnace has become heated, the primary air may be practically shut off, so as to take full advantage of the secondary air,

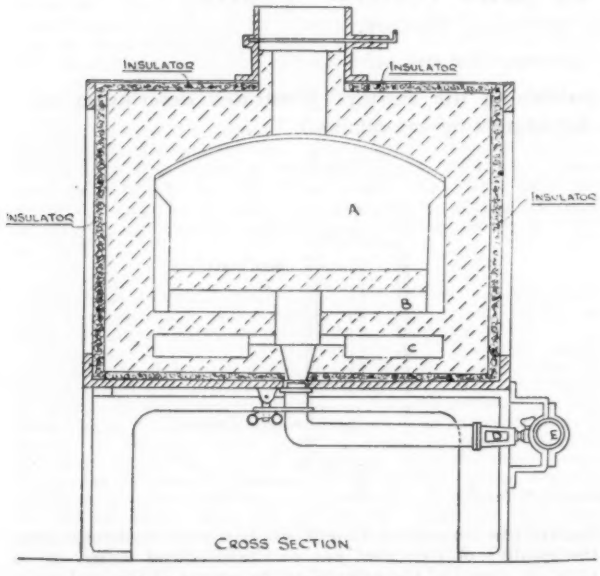


Fig. 1.—Natural-Draught Oven Furnace.

A Working Space.
B Combustion Chamber.
C Secondary Air.
D Primary Air.
E Gas.

which is pre-heated by passing between the furnace bottom bricks.

This is one of the earliest types of oven furnace, and considerable modifications have been made in recent years without materially altering the method of firing. The improvements are chiefly concerned with the system of taking away the waste gases, the admission of secondary air and the lagging of the furnace walls.

Recuperative Oven Furnace, Single Control.

This furnace (fig. 2) works with gas at ordinary town pressure, and the whole of the air required for combustion is supplied by a low-pressure fan. In the cross-section, the arrows show the path of the gases. The gas from the pipe G1 enters the structure under the furnace floor, and is there joined by the air supply which passes through the recuperator R. A spiral is placed inside the recuperator to give turbulence to the air stream, and so facilitate the heat exchange from the flue gases. The gas and air supplies are controlled from a single point, which also automatically opens and closes the flue damper. A gas and air proportioning valve ensures a proper proportioning of gas and air under all temperature conditions. The gas burns under

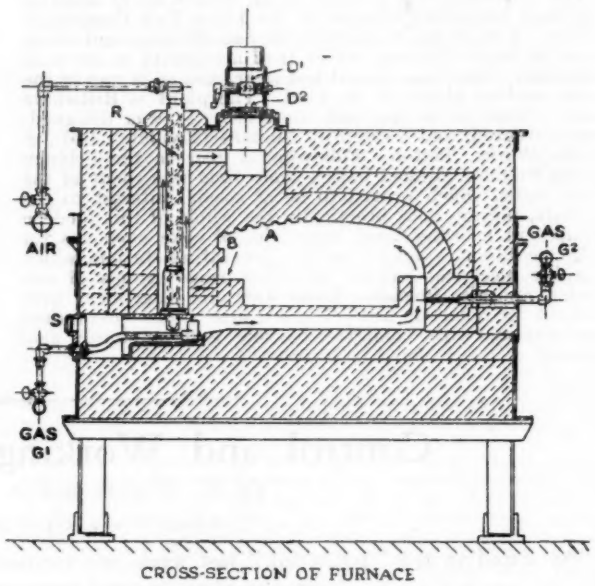


Fig. 2.—Recuperative Oven Furnace, Single Control.

A and B The brickwork is so arranged as to agitate and delay the flow of gases to ensure complete combustion and maximum extraction of heat within the furnace chamber.
D1 Butterfly damper connected with door
D2 Sliding damper connected with gas and air proportioning valve.
G1 Main gas supply.
G2 Secondary gas supply to give reducing atmosphere.
R Recuperator.
S Mica covered sight hole.

the furnace floor and in the working chamber. The flue gases pass round the recuperators before entering the main flue, and a large proportion of the waste heat is transferred to the incoming air. A portion of the brickwork inside the furnace is arranged to delay and agitate the products of combustion in order to obtain the maximum extraction of heat. There is a secondary gas supply which can be used when a reducing atmosphere is required. This furnace is well insulated and is much more efficient than the natural-draught type previously described, owing to the method of recovering the waste heat.

Recuperative Oven Furnace, Reversible Control.

Fig. 3 shows a substantially constructed furnace, built up with brickwork from the floor level. Gas is supplied at

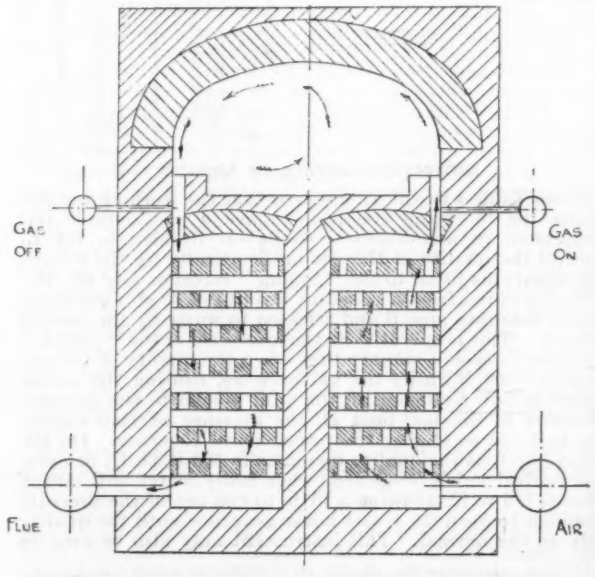


Fig. 3.—Recuperative Oven Furnace, Reversible Control.

* From a paper read at a meeting of the Manchester District Association of Gas Engineers in Leeds on May 19, 1933, following an inspection of the Industrial Demonstration Rooms of the Leeds Gas Department.

ordinary town pressure and air from a low-pressure fan. There are two brickwork recuperators with a solid wall separating them. The flue outlet is near the floor level. The sectional diagram indicates the positions of the gas and air supplies. These are in duplicate and reversible. Looking at the right-hand side of the drawing, the gas enters near the furnace hearth and is there joined by the air which rises through the right-hand recuperator. The gas burns in the working chamber and the products of combustion descend through the left-hand recuperator to the flue outlet below. After a while, this left-hand recuperator

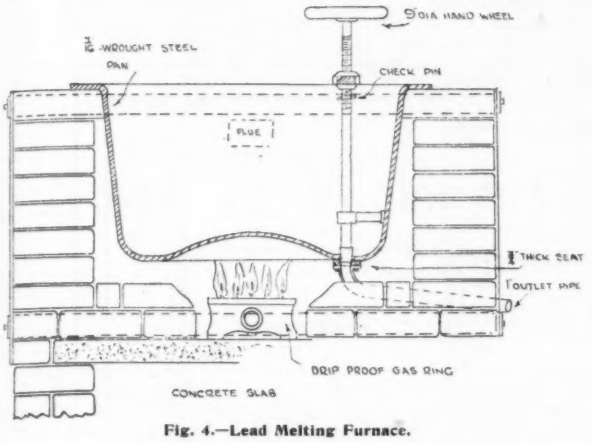


Fig. 4.—Lead Melting Furnace.

becomes heated by the waste gases. The process is then reversed by pulling a lever. The gas then enters the left-hand side of the furnace and is joined by the air which has passed through the left-hand recuperator and has become pre-heated from the waste heat of the first operation. The gas again burns in the working chamber and the products of combustion descend through the right-hand recuperator, which picks up the heat from the waste gases to be utilized on the next change-over.

There are many more types of oven furnace, but the three described are in use in this district. Each type has its own particular advantages, and a selection has to be made in accordance with the work for which the furnace is required.

Natural-Draught Furnaces.

The natural-draught type of oven still has many adherents. The one illustrated is simple in construction and is readily understood and controlled. The price of the furnace is comparatively low, usually about £10 per sq. ft. of floor area, and when used for short periods gives satisfactory results.

Natural-draught furnaces have been very much improved by increasing the insulation and recovering some of the waste heat from the flue gases. The cost of these furnaces has been increased to £40 per sq. ft. of floor area. An extreme amount of insulation is used in electric furnaces, but the circumstances are somewhat different. A saving of 50% in conduction losses may reduce the consumption of gas by 10%, but of electricity by 30% or more.

In the recuperative oven furnaces with air under pressure, the one with single-point control commences to recover waste heat immediately the furnace is started up, as the metal recuperator then comes into action.

In the reversible type, there is a considerable amount of brickwork to heat up before waste-heat recovery can be brought into action. However, for continuous working from day to day, the large brickwork recuperators will probably prove the most efficient, providing the reversing arrangement is properly attended to. In the long travel of the waste gases, a large proportion of the heat is given up to the brickwork.

The following are considerations with regard to the heating of high-efficiency recuperative gas furnaces by natural draught or by low-pressure air:

Natural draught has the advantage of saving the initial expense of a fan, and the cost of running it.

The low-pressure air design necessitates the use of compressed air provided by a fan.

For natural draught, the supply of secondary air is dependent upon the flue pull, and the exhaust damper must be accurately fitting to prevent an inflow of cold air when the gas is shut off.

In the low-pressure air type, the fan pressure air does away with the necessity of flue pull.

For natural draught the dependence on flue pull requires a close fitting door to the furnace, otherwise the suction of cold air lowers the efficiency.

With low-pressure air, the slight pressure in the furnace does away with the need of special accuracy in the fitting of the main door.

For natural draught the recuperation parts are complicated and somewhat expensive.

With low-pressure air, the recuperation parts are simple in construction.

Natural-draught furnaces are slow in heating up in the first instance. It is often found necessary to have a special flue outlet for use until the furnace is heated through, and then the recuperator comes into action, all of which requires extra attention.

The low-pressure air furnace is heated up quickly and in a simple manner.

Oven furnaces are used for processes such as annealing, hardening, normalizing, case-hardening, billet heating, plate heating, &c.

Town gas furnaces are very satisfactory for case-hardening work. This is a two stage operation, carburizing and re-heating. In Leeds the engineering products are of the heavy type, and the carburizing is usually carried out with a compound in closed boxes at a temperature of 900° to 950° C. Carbon is thus added to the surface of the steel parts. They are then capable of being hardened by re-heating and quenching in a suitable medium. The carburizing operation can be carried out with a gas consumption from 5 c.ft. per lb. of material, according to the depth of case required. The gas used for re-heating is usually about 2 c.ft. per lb., with full charges.

Lead-Melting Furnace.

This furnace (fig. 4) is of special design to meet the requirements of a lead pipe manufacturer. The pan is of pressed steel, in one piece, with outlet operated by a hand wheel, with spindle inside the pan and supported by a bracket. High-pressure gas at 3 lbs. pressure is used in a Keith Blackman burner with seven heads. The flames emerge from the burner heads in a horizontal direction and impinge against refractory material, which provides radiant heat, and flame contact with the pan is avoided.

The products of combustion pass round the pan to the flue outlet. As the molten metal is drawn off, it passes by gravity along a heated trough to the lead pipe machine below. The high-pressure gas is supplied from the street

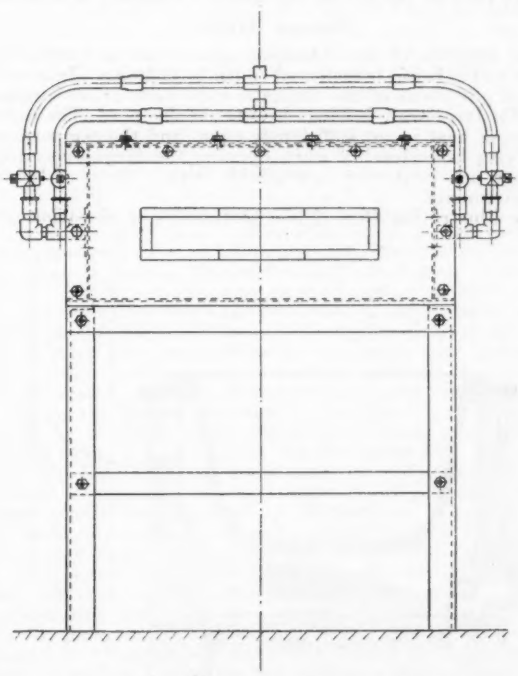


Fig. 5.—Gas and Air Blast Forging Furnace.

mains, and a constant supply is available. The gas consumption is 250 c.ft. per hour.

Gas and Air Blast Forging Furnace.

Fig. 5 introduces another system of gas burning. The gas is supplied at ordinary town pressure and air through a rotary air compressor at a pressure of 2 to 3 lbs. per sq. in. This enables a large amount of gas to be burned in a comparatively small space, producing an intense heat in a short time. A furnace with a working space 15 in. by 6 in. by 12 in. will consume 500 c.ft. of gas per hour. The heat-

ing is effected by radiation from the brickwork, and there is no flame contact with the work under treatment. The mouth of the furnace remains open, and this type of furnace is designed for high-temperature work and speed in heating up. The brick testing furnace in our Demonstration Room is an example of this method of firing, and a temperature of 1700° C. has been obtained when testing refractory materials.

Type Metal Melting.

The printing trade provides many openings for the use of town gas. The largest metal pots are to be found in newspaper offices, and these are each of 7 tons capacity. We have converted a series of these large pots from coke to gas firing, and although the new system is more costly, the dependability and all-round efficiency have given complete satisfaction to the newspaper proprietors. Three furnaces were converted as shown in the sectional drawing (fig. 6).

The burners are supplied with gas and air through low-pressure inspirators in which gas at ordinary town pressure is used along with air at a pressure of ½ lb. per sq. in. The hot products of combustion are blown on to the refractory material in the base of the furnace. This refractory rapidly becomes incandescent and radiates to the bottom of the pot. There is no flame contact with the pot itself. During stand-by periods, the metal is maintained molten by means of two atmospheric burners which use gas at ordinary town pressure. The air blower is only in operation during casting periods.

There are also many other heating processes in newspaper work calling for the use of town gas, including a large number of linotype machines. Heat controllers are advisable and work very satisfactorily. The remote control type of temperature regulator is used, similar to those on natural-draught central heating boilers. It may interest you to note that by displacing solid fuel, the gas consumption at the offices of the *Yorkshire Post* last year reached a total of 19¼ million c.ft.

In the smaller printing offices where one or two monotype machines are in use we find the clockwork system of lighting very satisfactory. The clock is set to light the burner one hour before the workpeople arrive and the machine is ready for use when required and without loss of time. The clock is arranged so as to miss lighting up on the Sunday and to turn on the gas on the Monday morning as required.

Baking Ovens.

The practice of bread-baking appears to be leaving the home and is being transferred to the bakehouse. Internally heated gas ovens of the domestic type have proved unsuitable for large-scale bakings by the shopkeeper. The distribution of heat is not sufficiently even, and the temperature falls very considerably when opening the large oven door. A more practical oven is available with a series of baking compartments.

The illustration (fig. 7) is a sectional side elevation of a

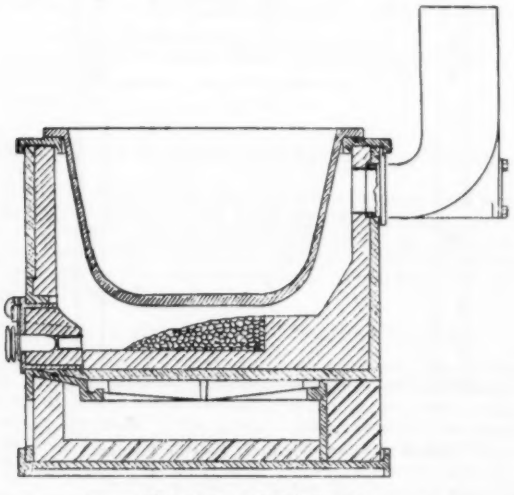


Fig. 6.—Type Metal Furnace.

four-compartment oven, the interior of which is arranged to secure circulation of heat.

Assuming the gas to be alight on the burners A, and all compartment doors B closed, the action would be as follows: The heat generated by the burning gas at A results in a rise of temperature and consequent rarefaction of the air in the lower part of the oven. The rarefied air, being displaced by the cooler and heavier air from the upper part of the oven, moves towards the back and upwards into the distributing chamber C, and through the spaces D at the top of the baffle plates E. The heated air then passes over the goods to be baked, where it loses part of its heat, regains part of its weight, and sinks by gravity over the front of the shelf F and down under the firebrick screen G, where it is re-heated and the cycle repeated.

During this operation, fresh air is continually entering the oven at the mouth of the air tubes H, and is distributed immediately under the burners A. The exhaust pipe I is

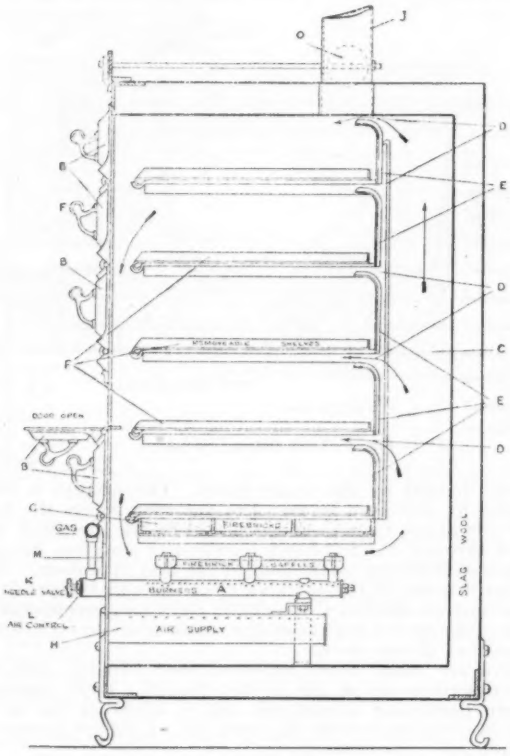


Fig. 7.—Portable Bakers' Oven.

fitted with an adjustable damper O, which cannot be entirely closed. Gas and air adjusters are fitted to the burners.

Large numbers of this type of oven are in use. It is inexpensive to install, and gives satisfactory results.

Central Heating.

In competition with solid fuel, the many advantages of gaseous firing justify a much higher price than coke on a heat unit basis. In changing over a set of coke fired furnaces to gas, the additional running cost involved amounted to £350 per annum, and the proprietors were perfectly satisfied. The price charged for gas in this case is 2s. 4d. per 1000 c.ft., equal to 5·95d. per therm. The advantages of cleanliness and reliability more than outweighed the extra cost of the fuel.

Oil firing has made rapid strides in recent years, and has been preferred to solid fuel in furnace operations where changing over to gas was regarded as too costly. However, gas has many advantages over oil fuel. We had a case of direct competition in a large bakery equipped with oil fired ovens. An additional oven was required with two decks 8 ft. by 6 ft. inside. We could not compete on running cost with gas at 7d. per therm; however, the baker was persuaded to inspect some of the Heat Trap gas-fired ovens in our area of supply. He was favourably impressed with the all-round efficiency and ordered from us a gas-fired oven at a cost of £350. This oven has given every satisfaction, and we are informed that if the oil-fired equipment can be disposed of, the bakery will be entirely changed over to gas firing.

However, we cannot hope to get many large consumers who are prepared to pay for gas upwards of twice the price of other fuels, even allowing for the greater convenience of gas. The nearer we can get to the price per therm of liquid fuel, the greater will be the opportunities for the extension of gas firing.

Although electricity is generally recognized as a costly means of industrial heating, it cannot be entirely ignored. It is repeatedly stated to be cheaper than gas. A large store was to be opened in Leeds with extensive kitchen equipment, and there was a desire to use electricity for

cooking, &c. We were eventually given an opportunity to state the case for gas. After several meetings and discussions with our customers' technical experts, a decision was made in favour of gas. The consumption of gas in this kitchen for a full year will reach 10 million c.ft. The price per therm and the efficiency of the various appliances were taken into consideration. Gas at 6d. per therm proved to be the better proposition against electricity at ½d. per unit.

Gas firing for central heating did not make much headway until a special scale of charges was introduced. The price of gas is now 2s. per 1000 c.ft. down to 1s. 2d. according to consumption; 5·11d. down to 2·98d. per therm. A considerable amount of business has now been done. We have, I think, the largest gas-fired central heating installation in this country, with a maximum gas consumption of approximately 20,000 c.ft. per hour; and this was secured in competition with oil fuel.

Our main competitor for central heating is the coke boiler. However, the actual requirements in B.Th.U. per heating season are much less in the case of gas firing than with coke. This is due to the smaller number of burning hours, and to thermostatic control. Coke boilers are usually kept half-burning during the night and on Sundays, while gas boilers are extinguished during these periods. A gas boiler installation requires little more than one half of the heat units of a coke fired system of equal capacity, and for intermittent use, the proportion is still more favourable to gas. This brings the running costs somewhat nearer together.

North of England Gas Managers' Association

(Auxiliary Section)

MEETING IN WALLSEND

The 26th Half-Yearly Meeting of the Auxiliary Section of the North of England Gas Managers' Association was held in the distribution offices of the Newcastle and Gateshead Gas Company, Wallsend-on-Tyne, on Saturday, May 27, when Mr. J. B. HENDERSON (Distribution Superintendent) dealt with several important factors of gas distribution in his Presidential Address.

The meeting was preceded by a visit to the Heaton, Newcastle, Works of Messrs. C. A. Parsons & Co., Ltd., the large firm of electrical engineers and turbo-electric generator makers. The fitting, erecting, and turbine shops were inspected, and later the party journeyed to Wallsend for the meeting.

CHAIRMAN'S ADDRESS.

By Mr. JOHN B. HENDERSON, Distribution Superintendent, Wallsend (Newcastle-upon Tyne and Gateshead Gas Company).

I wish to take this opportunity of thanking you for your confidence in electing me Chairman of the Auxiliary Section and give you a hearty welcome on this the first visit of the Section to Wallsend.

Since the absorption of the Walker and Wallsend Union Gas Company by the Newcastle Company in 1925, this district has become a self-contained unit of the distribution system of the latter Company, serving about 17,000 consumers through 110 miles of mains, the demand during normal conditions being largely of an industrial character.

During my connection with this district, distribution practice and apparatus have undergone many changes, and as these to some extent are probably typical of similar developments elsewhere some reference to the contrast between the old and newer methods may be of interest in reviewing our present practice.

MAINS.

The Wallsend district was originally supplied by 12-in. outlet mains from two works situated at Willington Quay and Walker respectively, and which were closed down in 1907 on completion of the new manufacturing station at Howdon, which was linked to Willington Quay by a 15-in. trunk main while supplying the rest of the district through a 24-in. governor, the holders at both the older works being kept in commission until recently. Since the amalgamation an additional 24-in. feeder main has been provided from St. Anthonys holder station, and being thus adequately supplied from two opposite extremities the district is secured a steady pressure at all hours. A main supplied from both ends in this manner is said to have four times the capacity of a main supplied from one end, and my experience with the district, when supplied from the Howdon governors only, showed a pressure loss of 3 in. which, since the St. Anthonys supply was connected, has disappeared.

Future developments under consideration will probably include a 24-in. connection between the two supplying stations, which, with the existing main of similar size between the Howdon and North Shields Works, will facilitate the transference of gas between the three works, and feed the district *en route*.

The laying of mains, especially of the larger sizes, is becoming more and more difficult due to the growing congestion of underground electric cables and telephone ducts during the last thirty years. The practice of the electrical industry in boring under carriage ways, and threading the cables from one side of the street to the other, while admirable from their point of view, opens up possibilities of potential accidents where unsuspecting workmen of other utility departments have to excavate at this point. For these reasons larger size main-laying operations require careful planning and detailed examination of alternative routes, this work being in our case arranged and carried out by the Chief Engineer's Department.

Considerable economy both in labour and material can be almost invariably brought about by preliminary surveys of this kind, particularly if detailed plans and sections of the selected route are prepared beforehand. As an example, a 500-yards section of the 24-in. Howdon to North Shields main was designed with a rise of 1 in 1000, and this was accurately achieved by fixing the height of the profiles with a dumpy level and sighting the bottom of the trench. The profile method of preparing the trench bottom has become more necessary since the introduction of spun pipes of 12 to 24 ft. in length, to ensure that the pipe will be on a solid bed over its entire length.

The distance between the Howdon and North Shields Works is 3½ miles, and the main was laid with the gas on for its entire length, a double sheet rubber drag with a space of 15 in. between the rubbers being used.

The use of the sheet rubber drag when laying cast-iron mains with the gas on is simpler than the old method, as the drag is merely drawn forward after each successive length is laid, thus eliminating the bagging off each morning, and releasing the bags each time a test is made before filling in the trench. The under-pressure drilling machine for making connections from live mains is now indispensable in distribution practice and has reduced the hazards which existed with the old methods of main connections.

During the recent alteration in the line of a street it was necessary to move about 800 yards of 6-in. spun pipe in 12 ft. lengths to a position in the new street line, and as we were able to make the main dead for a fortnight it was decided to burn out the joints with an oxy-coal gas burner, which proved very successful. As both the taking up and the re-laying were done concurrently, it was possible to get a gas supply from the main when laid in the new position about 80 ft. away. A 100 c.ft. bottle of oxygen was sufficient for ten joints, and the time taken was six minutes per joint. By this method we also saved 100 ft. of 6-in. pipe, as, by cutting across the face of the socket, about 6 in. of pipe would have been wasted per 12 ft. length. The "Kut-Out" machine for cutting a pipe circumferentially has rendered the cutting of large mains a more satisfactory operation than could be guaranteed with the old method of diamond point and flat chisel, and, though the time taken may be longer, a perfectly square cut is always obtained.

The practice which was prevalent at the close of the last century of laying one main in the carriage way has given way to the improved method of a main in each path, and in streets where the service pipes require renewal, two mains are laid and the centre main discarded.

SERVICE PIPES.

Both new and re-laid service pipes are a minimum size of 1-in. wrought iron of steam quality, heavily coated with

bitumen and wrapped with hessian cloth to guard against the external corrosion, while the interior is treated with a red lead paint to prevent the rust which is responsible for the majority of choked services. Naphthalene stoppages, which were so numerous a few years ago, have now disappeared, as the naphthalene-content of the gas never exceeds a faint trace.

The combined drilling and tapping machines for service holes of ¾ in. to 2 in. diameter are a great improvement on the old method of cutting holes with the hammer and chisel and riming and tapping by hand. The new method is much quicker and minimizes the risk of split mains at the service holes. The improved tools, together with the provision of special breathing apparatus, have been instrumental in reducing the number of workmen affected by coal gas while engaged in main and service work, and such incidents are now rare.

The subsoil in the Wallsend area is mostly clay, and the life of the service pipes, before renewal is necessitated by external corrosion, is between 30 and 35 years, although in one case, a street of services had to be renewed after being in use only 5 years, the subsoil in this case being made up of ashes. As a precaution against this vicious attack, the renewed wrapped pipes were surrounded by puddled clay, and these have now been in use for 20 years.

Meters.

The dry meter in use to-day is, with slight modifications, the same as that invented by Messrs. Croll and Richards almost a century ago, and the introduction of the high capacity meter within the last few years is a feature of present day development, although the shape and action is practically the same as that invented by those pioneers of 1844. The ever-increasing number of appliances per consumer has rendered the size of meter to be adopted a very important one, more especially in the case of the high capacity type, which must not be worked above its badged capacity. The 80 c.ft. meter has been adopted by this Company as the minimum size, except in special cases where the No. 2 Standard size is fitted.

Lacey's " Monitor " dial fitted to the ordinary meter was one of the early inventions of the prepayment type, and consisted of a special dial which was set at the number of cubic feet paid for by the consumer. When this quantity was nearing exhaustion, as shown on the dial, the consumer arranged with the Gas Authority for a further supply, otherwise when the pre-arranged quantity had been consumed no more gas was available until a further payment had been made and the dial reset. The prepayment attachment in use to-day is the result of improvements spread over half-a-century, and is a very simple device, practically foolproof, and mechanically sound. The excessive pressure absorption of the old type prepayment attachment is now greatly reduced, and stripped worm wheels on the crank spindle which were common on the early type have practically disappeared. The leather to white metal prepayment valve can be relied upon to shut off unless rust particles are carried forward with the gas and deposited on the " button " or valve face. As a precaution against prepayment valves failing to close due to these deposits, we have a fine brass wire gauze inserted in the inlet tube, and any rust carried forward to this point falls into the solid bottom of the filter which can be removed and emptied. In support of the claims for the prepayment meter to-day, the following will be of interest. From January, 1925, to June, 1932, 5227 new prepayment meters were fixed in the Wallsend area, and of these, only 57 or 0·97% were returned to the makers under the five years guarantee period.

Unaccounted-for Gas.

The old meter is looked upon by most distribution officials with suspicion in relation to unaccounted-for gas, and during a recent test of the domestic meters *in situ*, with a 1-ft. test burner, many were found passing unregistered gas, in some cases to the extent of 8 c.ft. per hour. In the case of prepayment meters found faulty in this respect, the survey card gave no clue, the cash in the box agreeing exactly with the consumption registered at each visit of the collector. The amount of gas passed without registration through faulty meters is governed to a large extent by the apparatus in use, and the habits of the consumer. The house fitted with electric lighting and gas for cooking or heating is not so likely to get " free " gas as the consumer who uses a small lighting burner only for long periods. The by-pass burner and distance lighting switch is also a severe test on the meter when the by-pass only is burning, as this small quantity of gas may be passed without registration although the meter may be deemed correct within the meaning of the Sales of Gas Act; which demands the small size meter to register a minimum quantity of ½ c.ft. per hour. The street lamp by-pass, if not properly attended to, may be another factor in unaccounted-for gas total, inasmuch as each 0·1 c.ft. per lamp per hour over the amount allowed is equal to a million c.ft. per annum for every 1141 lamps in use.

The street lighting burner has also received attention by our Company, with a view to reducing the unaccounted-for gas, and fixed nipples giving the maximum efficiency in each size of lamp have been adopted together with pressure governors set at twenty-five tenths. With this combination it is possible to arrive at the exact amount of gas used in street lighting. Clock controlled street lighting, though very reliable, is not so perfect that inspection at extinguishing time can be dispensed with, and any failures (especially during the summer months when the clocks operate in the early morning) help to swell the unaccounted-for gas if not detected and shut off.

Mains and services are of course the chief sources of leakage, and it is only by systematic renewal of both wherever necessary that the unaccounted-for figure will be kept within reasonable limits. During the last six years, 4¼ miles of 2-in. and 3-in. cast-iron mains have been replaced with 6½ miles of 4-in. and 6-in., while during the same period 5448 services have been re-laid in this Wallsend district.

The location of escapes from mains and services under the modern road surfaces which form a sealed cover, requires more particular methods than were necessary with the water-bound macadam or paved streets. The wireless main finder gives the exact position of the pipe underground, and the leak indicator where the most gas is present, but the fault may not be found within 100 or 200 yards from the point indicated. If a telephone duct or earthenware pipe with open joints adjoins the fractured main or leaky service, the gas may find its way into the duct or pipe and travel until an obstruction causes it to leave through the joints or into a manhole.

The P.O. Telephone Department have now adopted the policy of running all wires underground if possible and this makes the operation of spiking the ground for the use of the indicator more hazardous, as the earthenware duct offers no resistance to the spike point and if driven through among the wires may entail a costly repair.

Street Lighting.

Street lighting throughout the country has received increased attention during the last few years, partly due to electrical competition and partly to improvements made necessary by the ever-increasing number of motor vehicles using the roads. In face of keen electrical competition, cluster low-pressure gas lamps are the most favoured in these improvements, and many thoroughfares are now well lighted with this type of lamp, although the older residential streets are still in need of modernization. In this, as well as in many other districts, the columns which carried the old type square lantern and flat flame burner spaced between 50 and 60 yards apart, still stand where erected in those far off days, the lantern and burner only having been changed. The present practice on new estates in this area is 13-ft. columns spaced as near 40 yards diagonally as street intersections will allow, the candle-power being governed by the importance of the street.

The introduction of the British Standard Specification for Street Lighting has given the responsible authorities a standard for street lighting, and until this is adopted throughout the country we shall continue to have the present varying degrees of good and bad street lighting. Good public lighting is one of the Gas Industry's best advertisements, and where Local Authorities regard their responsibilities with indifference, permission should be sought to give a demonstration of what can be accomplished with the modern gas lamp at the proper height and spacing. Such demonstrations would seldom fail to convince them that poor street lighting is money wasted.

Domestic Uses.

Coal gas was primarily manufactured for lighting purposes, and Murdoch in 1805, in a paper published in the " Philosophical Transactions," showed how much cheaper a Lancashire mill could be lighted by coal gas than by candles. After the test of one hundred and twenty-eight years, we are still able to claim that we can produce the cheapest and best methods of artificial lighting, although our competitor, Electricity, is a much more formidable one than Murdoch's. This claim, of course, is only made possible by the introduction of the Bunsen burner and incandescent mantle. It would be foolish to deny that the electrical industry is gaining converts, but in my experience the majority of householders who change over do so not because they are dissatisfied with gas, but because they are inclined to regard electricity as more fashionable and up-to-date.

In order to find out the relative popularity of gas and electricity for lighting purposes, a census was taken last

year of the houses built since 1920 by the local Council, and the following particulars obtained:

(*a*)	Houses gas fitted when built and still using gas light	357	412
(*b*)	,, ,, ,, ,, now using electric light	55	
	Changed to electric lighting, 13·3%.		
(*c*)	Houses wired when built and still using electric light	408	798
(*d*)	,, ,, ,, ,, now using gas light	390	
	Changed to gas lighting, 48·9%.		

All the houses had gas cookers and boilers fixed when built, so that in the houses converted to gas lighting it was only necessary to run a supply to the lighting points, no further capital expenditure being involved, whereas in the case of tenants changing to electricity electric mains and services were necessary. We made a stipulation that no gas fittings would be fixed in the bedrooms unless a point was accepted in the living room, and a charge of 1s. (which may be paid in cash or deducted from the prepayment rebate) is made per point, and which charge includes the burner and mantle.

The Council, seeing that the floor boards were being taken up and walls cut through for the installation of gas pipes and electric wires in the houses shortly after completion, decided to install both forms of illumination in a later 120 houses built, thereby giving the occupier the option of electric or gas lighting. A comprehensive charge was made to the Council for main extension, branch and service, carcassing, and supplying and fixing wash coppers in these 120 houses. The fittings, burners, and cooker are fixed when the tenants take possession.

The provision of electric lighting in houses such as these, which have a gas service for boiler and cooker, might appear an unnecessary charge on the houses, but as the Englishman's home is still his castle, he is entitled to have electric light if he so wishes, and similarly, if electric light is installed and he wishes a cheaper and better light, he is surely entitled to have it.

The regulations for the wiring of buildings issued by the I.E.E. do not appear to contain explicit instructions to contractors to keep the steel conduits used in wiring installations apart, or insulated from gas pipes, and in consequence of this omission, the conduits are often run under or directly over interior gas pipes. There is, of course, no danger when the cable insulation is perfect and the conduit properly earthed, but should a fault develop, and the conduit become " alive " and arc over to the gas pipe, the consequence may become serious. We have had several such incidents in this district and take every opportunity of impressing upon the wiring contractors and our own fitters the necessity of keeping the conduits and gas pipes as far apart as possible.

Cookers.

The evolution of the cooker has been more rapid during the last ten years than at any period since its introduction, and the high-class all-enamel cooker as we know it to-day, with its automatically controlled oven, seems to have reached the height of perfection both in appearance and efficiency.

The unpacked cookers supplied with prepayment installations are being gradually exchanged for a modern packed cooker on payment of a small charge by the consumer, which can be collected out of the rebate if so desired.

Gas Fires.

The modern gas fire with its improved radiants and silent burner has been accepted as an economical heating agent in bedrooms and such other rooms as are used intermittently, but the cost of gas is the chief deterrent to its general adoption in the home of the average consumer. This obstacle to increased consumption will be overcome when the Industry is in a position to give preferential rates, sufficiently low to warrant the general adoption of gaseous heating either with gas fires or central heating systems.

Gas Boilers and Water Heating Apparatus.

The gas boiler has been received by all classes as a necessary part of the gas installation, and even in the miner's household (where coal is part of his wages) the gas boiler is appreciated.

The gas-heated water apparatus does not make the progress we would wish in the North of England, in spite of advertising, demonstrations, and canvassing. The climatic conditions in this part of the country, necessitating fires nearly all the year round, are perhaps more responsible than any other factor for the comparatively low percentage of this class of apparatus in use.

Maintenance.

It is acknowledged by the Gas Industry that a good sales department with suitable showroom is necessary to give practical demonstrations of gas consuming apparatus, and most undertakings have made themselves responsible for the maintenance of the apparatus when fixed on the district.

A lighting maintenance department has been in existence in this district for about 25 years, charging only for the material supplied, the labour being free. About five years ago, a universal service department was formed, to visit the consumers' premises once every year and overhaul all apparatus whether privately owned, hired, or supplied through prepayment meters. We are now on the sixth round of the district, and our experience shows that the service rendered is appreciated by the consumer. The scheme has also been instrumental in locating obsolete apparatus, and information regarding this is passed on to the sales of gas department, whose representatives call upon the consumer and advise the best type of modern appliance in lieu of the obsolete piece in use. The universal service fitters have a stock of lighting burners in their service cart, and these are fitted for a nominal sum, replacing the shoddy burner from the cheap store. These shoddy burners are undoubtedly the best agent the electrical industry has, and if the lighting load is to be retained for gas, the Gas Industry will have to undertake the renewal of lighting burners free or at a price to compete with the cheap store. In addition to the visit of the universal service fitter once a year, the gas fires in public houses, halls, churches, and shops are overhauled in the autumn and water heaters in the spring.

Industrial Uses.

The following extract from King's Treatise is of interest as a prophecy which materialized, but gave way to scientific progress:

> The application of gas as a motive power has of late years taken such rapid strides, and is at the present time advancing with such certainty as to give it an important bearing on gas manufacture. Indeed so great is the demand for gas engines, and so general the satisfaction attending their use, it would scarcely be too much to say that in the course of a few years the users of them will have become among the most extensive, reliable, and profitable class of consumers which the suppliers of gas can have.

The prophecy of 1884 became true, and gas engines were the prime movers in all engineering works, shipyards, and factories in this area until about 30 years ago when the electric motor took their place. The enormous consumption lost when this change occurred has, however, been made up by the many new industrial uses to which gas has been put, among the latest of which is compressed gas for road transport. It is hoped in the near future that we may be able to apply Mr. Newbigging's prophecy of half-a-century ago to the road transport engine instead of the stationary engine.

While the industrial uses of coal gas are constantly being increased, it is important to bear in mind that the electrical industry is also alive to the advantages of the industrial load and is making similar progress. Plumbers' shops in shipyards are sources of good consumption with gas furnaces for heating iron and steel pipes for bending, but in two of these hydraulic machines have been introduced for cold-bending pipes up to 8 in. diameter, thus reducing the amount of gas used for this purpose. These changes show that having secured an industrial process for gas, we ought to keep the apparatus at the highest pitch of efficiency and thus make the position less assailable by our competitors.

During the depression in shipbuilding, one large shipyard in this area undertook the breaking up of a large liner, and we were able to prove that oxy-coal gas could be used at an economical price for cutting-up purposes in opposition to oxy-acetylene. Time does not allow the mention of many other successes of the industrial department, whose representatives are ever on the look-out for new sources of consumption. These representatives form one of the most important branches of the sales of gas department, and to be successful should possess, among other qualifications, general engineering and metallurgical knowledge.

Education.

Any mention of improvements in the Gas Industry during recent years would not be complete without contrasting the educational facilities of 25 years ago with those offered to-day. A quarter of a century ago an evening class was in existence at Rutherford College for tuition in Gas Manufacture and Supply. The syllabus was intended to cover every branch of the Industry, and consequently there was only time for a general study in each branch. A course in each section spread over a number of sessions gives the student to-day the facilities for both practical and theoretical training, while the Institution of Gas Engineers demand that intending members must show their proficiency before being admitted members of this Institution.

The Future.

Having given an impression of improvements viewed from the distribution department during the last 20 to 30 years, what changes are expected in the future? If the metallurgists give us a metal or alloy of a non-corrodible

nature at a reasonable price, cast-iron mains would be discarded in favour of longer lengths of lighter and unfracturable material. With a similar material service pipes would have an almost unlimited life, while rust stoppages would be unknown. The electrical industry has introduced an agreed frequency for all electricity supplies in the country, and in a similar way if the Gas Industry were able to agree upon a common standard of thermal value, all gas meters could be made to register in therms, which is the term used whenever the selling price of gas is quoted. A uniform calorific value and composition—if this ideal is possible—would also be a great advantage to all makers and users of gas-consuming apparatus which could be fitted with fixed nipples capable of producing the maximum efficiency.

Early legislators on matters relating to gas supply appear to have omitted to give attention to the interior pipes, and this omission has cost the Industry much expense and worry. The water supply is refused unless the size and quality of the pipes and fittings comply with the regulations; the house wiring is tested by the authority and must be to their satisfaction; and the drains cannot be covered up until inspected and passed by the Health Authority; but an apprentice plumber in the first or second year at the trade may be allowed to run the pipes which are " only for gas."

If the Industry makes itself responsible for the maintenance of the apparatus, surely we should have powers to specify the size and material of pipes and fittings to be used. Mr. Read, in his Presidential Address last year, pointed out the benefits of heat insulation, and much more might be done to conserve the radiation losses from gas furnaces and other gas apparatus.

Although it has been pointed out in another part of the address that improvements have taken place in the educational facilities, the Gas Industry does not as a rule allow the same opportunity for study that is afforded by some engineering works and shipyards. The electrical, marine, and mechanical engineers are allowed to attend a Technical College for six months in each year for three or four years, the other six months being spent in the shops or drawing office. By these arrangements students take a much keener interest in class work than can be expected when at least three evenings per week for nine months are spent at evening classes.

In the time at my disposal I have touched briefly on a few improvements in distribution practice and apparatus, and hope that the future may see this branch of the Industry receiving more attention than was meted out in the early stages of gas supply.

In conclusion, I should like to thank the Directors of the Company and Mr. Ridley and Mr. Tarratt for the facilities afforded us to-day.

Votes of Thanks.

Mr. William Batt (Newcastle), proposing a vote of thanks to the President for his Address, said that, together with the visit they had enjoyed, it had ensured the complete success of the meeting.

Mr. F. P. Fall (Sunderland) seconding, said he wished to add his appreciation of Mr. Henderson's Address, for it stressed in particular one difficulty which he himself had met with and which had resulted in a considerable amount of trouble. He referred to the growing congestion of underground electric cables and telephone ducts. In one particular job he had handled they had experienced much trouble, cost, and inconvenience due to that.

The vote of thanks was warmly carried, and in reply Mr. Henderson said that his effort had been well repaid by the interest which it had kindled.

A question was asked as to the progress being made with the Presidential Certificates, and it was decided to forward framed certificates to Past-Presidents, and that to Mr. Henderson the presentation would be made at the conclusion of his period of office.

Mr. G. E. Anderson (Willington Quay) proposed a vote of thanks to the Directors of Messrs. C. A. Parsons & Co., Ltd., for their kind invitation, and to Mr. Crocker, the Works Manager, and staff, who had conducted them round the works.

Mr. J. E. Dixon (Newcastle) seconded the vote, which was carried with enthusiasm, and the meeting concluded with tea provided by the Directors of the Newcastle and Gateshead Gas Company.

NOTES ON PLANT AND PROCESSES

Two Fine Brochures.

For sixty years the name of " Wellman " has been associated with the practice of steel making and general engineering, and has been identified with many of the improvements introduced in steel manufacture and material-handling in its broadest aspect. The Wellman Smith Owen Engineering Corporation, Ltd., of Victoria Station House, S.W. 1, have recently published two exceedingly fine brochures, well produced and profusely illustrated with photographs of typical examples of the firm's work.

The first publication (or Section I.) provides in concise form a general survey of the firm's products, which range from the smallest engineering unit to the complete steel plant. On the foundation of their long and extensive experience, and data constantly enriched by world-wide practice, the Corporation have built up a specialized engineering service, some of the many ramifications of which are admirably set out in the brochure.

The second brochure (Section II.) is confined to the mechanical side of the business as distinct from the furnace and constructional departments, and the specialities described in the pages of this publication may be grouped under four principal heads:

(1) Material-handling equipment for steel works and allied trades.
(2) Electric cranes of all types, transporters, and general hoisting machinery.
(3) Coke oven machinery.
(4) Miscellaneous machinery and equipment.

Widely divergent conditions of service demand machines of special design in a majority of cases, and, therefore, within the limits of this brochure it is only possible to show general types, but the machines described and illustrated suffice to indicate the general nature of the firm's wide range of products and the high class of workmanship entering into their manufacture.

The Corporation's engineering works at Darlaston, South Staffs, are among the most up-to-date in Great Britain, and are thoroughly equipped with the latest machine tools and appliances. There are, in addition, laboratories and testing sections where all materials are minutely examined. It is also the aim of the firm to study the welfare of its employees, and in addition to the usual auxiliary services, such as the provision of a recreation room, canteen, and ambulance room, the grounds adjoining the works have been laid out for all kinds of sports. Reference is made to these staff welfare facilities in order to show that nothing is left undone which could, however remotely, conduce to better conditions of employment, and consequently attract the highest degree of skill to the workshops.

Life of Bearings Increased by Dynamic Balancing.

Many parties are visiting the works of Messrs. Mavor & Coulson, Ltd., of 47, Broad Street, Glasgow, S.E., to see conveyors, loaders, and coal-cutters under construction; the visitors on May 19 were forty of the Staff Association of Messrs. Babcock & Wilcox, Ltd. They were particularly interested in the means of testing rotors for running (dynamic) balance, which ensures correct balance even at high speed, resulting in reduced vibration at high speed, reduced load on bearings, and therefore increased life for the bearings. The position and amount of out-of-balance forces are accurately measured and corrected.

Another piece of test-bed apparatus, the value of which was appreciated, was the explosion chamber, in which flameproof plant is tested by the explosion of gas within it. Skeletons showing the moving parts of the " Samson " and " Low Seam Samson " were inspected, and many conveyor driving gears under construction, one for driving two hundred yards of conveyor up a gradient of one in three-and-a-half. These driving gears are compact and well balanced, motor and gearing being carried on the cheeks which house the driving drum bearings. A new coalcutter was seen on crawler mountings, which has been introduced into machine mining by the firm. These crawler-mounted machines are giving remarkable results underground in " trackless mining," to use the name the manufacturers have given the system.

Much interest was displayed in a film showing the M. & C. Joy Loader at work underground, loading 1½ tons a minute, on the surface at colliery sidings and gas-works, and loading sand and gravel at over 2 cubic yards per minute.

XUM

Parkinson & Cowan

A Year of Re-Organization and Development—Encouraging Progress—Lt.-Col. H. W. Woodall's Commentary

The Thirty-Third Ordinary General Meeting of Parkinson & Cowan, Ltd., was held on Friday last, May 26, at Terminal House, Grosvenor Gardens, S.W.

Lt.-Col. H. W. WOODALL, C.I.E., M.Inst.C.E. (Chairman and Managing Director), presided.

After referring to the retirement from the Board of Mr. F. R. Smith, the Chairman alluded to the fact that the Annual Meeting was being held somewhat earlier than usual, it having been arranged to close the accounts of the Parent Company and all its subsidiaries on Dec. 31 instead of on varying dates as in past years.

The Chairman next dealt with the summary of assets and liabilities of subsidiary companies which had been issued with the report and accounts, and commented on the principal changes in the balance-sheet.

Continuing, he said: The general affairs of the Company and its recent history were dealt with at length in my remarks last year, but you may be interested to hear something of what we have done in regard to general re-organization and development since that date.

ADVANTAGES OF UNIFIED WORKING.

In the first place, we have concentrated the entire secretarial and most of the clerical and costing staff of our English subsidiaries on one floor in this building. At the same time a new and uniform system of purchasing, costing, wages control, stocktaking, &c., was introduced throughout all our subsidiaries at home. The work of getting the new system into operation by the commencement of the current year imposed a heavy burden on our senior staff, and, by reason of the necessity of calling in outside technical advisers of the highest standing, added to the financial burden of the period under review. The scheme will, however, afford the Company considerable financial relief now that a number of staffs are assembled at the one headquarters and certain hitherto duplicated posts are done away with. A greater advantage, however, lies in the concentration of our energies in one centre, thereby gaining added efficiency consequent upon personal contact between our various heads of departments and the elimination of correspondence, with its attendant misunderstandings and delays.

Economic production is no haphazard matter, and our works are not being neglected. In addition to the older scientific methods generally referred to as research, a form of factory development and control has come into being, under the name of production engineering, involving motion study and the development of all factory processes on scientific lines. These matters deserve, and are receiving, our most careful consideration, and we hope by the steps we are taking for the discriminate introduction of such methods into our organization to remodel our system on the most economic modern lines.

TESTIMONY FROM THE BRITISH INDUSTRIES FAIR.

It was wisely said a very long time ago: "Let not he that girdeth on his harness boast himself as he that taketh it off," but while the time for any relaxation on our part is still far off, I think it only fair to our Directors and staff, who have worked with such whole-hearted devotion during the past few months, to express appreciation of the encouraging progress made. I am further tempted to mention this matter because the demonstration we were able to give at the British Industries Fair evoked much favourable comment to the effect that our apparatus as exhibited is fully equal to the best of the admirable productions of which our leading competitors are rightly proud.

One word as to the future. The path of recovery is a painful and expensive matter, particularly in these difficult times, when the reduced purchasing power of the public, in itself one of the inevitable consequences of cheap money and conversion schemes, is calculated to have an unfavourable effect on our business, and shareholders will not, I hope, anticipate any spectacular performances. No effort will be spared to stimulate recovery, and, may I add, it will be the endeavour of the Directors to see that the first people to hear of any change in the position of the Company will be the shareholders.

SOME ASPECTS OF PRESENT-DAY INDUSTRY.

Looking at the wider aspects of industry, it appears that the world has been moving faster than our industrial methods. The telephone and modern transport have worked a revolution, the effect of which has not been fully appreciated, but in international and industrial affairs two facts stand out which cannot be ignored—first, that redundant productive capacity leads ultimately to increased cost of production, and, second, that we cannot hope to live on the poverty of our neighbours. Quotas and restrictions that can be removed at any time create an artificial protection which fails to look after the public, and is dangerous to the producer. May I suggest that greater consideration might be given to the methods successfully developed by the Gas Industry, which, through the foresight of the late Sir George Livesey, first by means of sliding-scale dividends, reconciled the interests of shareholder and consumer, and later, by adding co-partnership, correlated the triple interests of capital, labour, and consumer. These methods are not appropriate to all industries, but they are capable of a much wider application than has been accorded them so far. Sir George's policy was based on justice, wisdom, and goodwill, and has been abundantly justified. A careful study of that policy and its results might well lead to a general improvement in industry, and help to allay the chaos and discontent existing in the world to-day.

The report and accounts were unanimously adopted, and the proceedings terminated with a vote of thanks to the Chairman, Directors, and staff.

Primitiva Holdings, Ltd.

The Fourth Ordinary General Meeting of Primitiva Holdings, Ltd., was held at Winchester House, Old Broad Street, London, E.C. 2, on Tuesday, May 23—Mr. P. ASHLEY COOPER, Chairman of Directors, presiding.

The MANAGER AND SECRETARY (Mr. Mark Denne) read the notice convening the meeting, together with the Auditors' report on the balance-sheet for the year ended April 30, 1933.

THE CHAIRMAN'S ADDRESS.

The CHAIRMAN, having moved the adoption of the report and accounts, in the course of his address, said that the accounts which were before them were in exactly the same form as in previous years. They would notice that the total number of shares now exchanged by the gas shareholders for shares in the Holding Company amounted to 98·67%. The big change in the accounts, compared with those of last year was that they had received no dividends from the Primitiva Gas Company. The operations of the Gas Company were fully maintained, and the failure to pay a dividend was wholly attributable to the lack of exchange. Although they had received no dividend on their holding of ordinary shares in the Gas Company, the revenue for the year was £26,000, and after making full provision for all expenses, British income-tax, and the sinking fund upon the preference stock, they had approximately £19,000 surplus—sufficient to pay the dividend on the preference stock with a very handsome margin.

This year, continued the Chairman, had been one entirely dominated by the exchange position. Conditions in Argentina had been difficult, owing to the economic condition, not only of that country, but of the whole World, and in certain sections of their business they had suffered. Nevertheless they would be gratified to know that taking all their operations into account, the gross revenue of the Primitiva Gas Company for 1932 at £400,000 was practically as high as 1931, and the net revenue of £166,000 came within £800 of the balance for the previous year. Such changes as there were on the balance-sheet had gone to strengthen it. They had expended £64,000 on capital account, and the reserve accounts now stood at a total of over £1,400,000. Cash had risen during the year by no less than £246,000, but in the present circumstances that was a matter for less congratulation than appeared at first sight, because large sums were lying in Buenos Aires which they had been unable to remit.

IMPROVED WORKING AND CONTROL.

It was probably a matter of some surprise to the shareholders that, in spite of the fact that the Company had had such difficult conditions to face in Argentina, and that considerable sections of their business, as he indicated to them, had been less profitable than previously, they should have been able to present a profit and loss account which showed no material falling off in the results of their operations. The explanation was one which gave them real gratification. It was the extension and improvement of those methods of working and control which he described last year. In almost all directions the results were noticeable. This was the keynote of their operations this year. He would give just one example, not exceptional, but typical of many. In the Public Service Department, despite an increase of 6·2% in consumer months, there was a decrease of 15·3% in adjustments made in respect of complaints. This reduction in the number of complaints was due to co-operation between the Public Service Department and the Manufacturing and Distribution Departments. But that was not all. The Public Service Department had attended to these complaints at a cost which showed a progressive reduction of 22% as compared with the figures for 1931, which in turn were less than those for the year 1930, both in total and on a unit basis. Throughout the whole business there had been continuous economies, not by drastic methods, but by rational methods. These had been contributed to, not only by their Chief Officers, but by the whole of the Staff.

In 1930 chemical sales showed a falling off, but in 1931 they

recovered the setback, and in 1932, in spite of the general conditions, they again had an increase over the preceding year. The Industrial Company again contributed to their revenue, and the Provincial Company earned a profit the whole of which went to strengthen the balance-sheet.

On of the reasons for their better results had been the establishment and free use of their chemical laboratories for control and for research. It would be recognized that their operations were small when compared with those of the great gas undertakings, but he believed that they conducted more chemical control and research, and placed greater reliance on these activities, than any other gas concern of their size in the World. They had spent appreciable sums of money on their laboratories, and they did not regret this expenditure, for undoubtedly it had contributed greatly to their success.

Mr. FRANK H. JONES, M.Inst.C.E., seconded the resolution for the adoption of the report and accounts, which was unanimously carried; after which the retiring Director (Mr. Frank H. Jones) and Auditors were re-appointed, which concluded the business of the meeting.

Sunderland Gas Company's Special Order

(*House of Lords: Before Lord* MESTON (*Chairman*), *Lord* SANDYS, *Earl* MORAY, *Earl* CAWDOR, *and Lord* CARNOCK.)

The Sunderland Corporation carried to a House of Lords Select Committee its opposition to the Special Order promoted by the Sunderland Gas Company, the principal purpose of which is to apply the basic price and basic dividend system to the Company. The Corporation contends that the present is not an appropriate time to apply this system to the Company, giving it an opportunity to increase dividends. It also raises objections to other proposals, relating to renewal, special purposes, and other funds. The Order has been made by the Board of Trade, and now has to be approved, or otherwise, by Parliament.

The Corporation opposed the Order before the Board of Trade in the autumn. (See "JOURNAL" for Nov. 23, 1932, p. 575.)

Monday, May 22.

The Committee proceedings opened on Monday, May 22. Mr. F. J. Wrottesley, K.C., and Mr. H. Royston Askew appeared for the Company, with Mr. Geo. Evetts as expert witness. The Corporation was represented by Mr. Sydney G. Turner, K.C., and Mr. Cope Morgan, and Mr. Arthur Valon (of Messrs. W. A. Valon & Son, Consulting Engineers, Westminster) was present as the Corporation's technical adviser.

Mr. WROTTESLEY, in his opening address, said that, although the Company had asked for, and had thought they had justified by figures, a basic price of 6·5d. per therm, the Board of Trade had fixed the basic price at 6d., the basic dividend being 6%. With a maximum price of 9·6d., and a charge of 6d., there was no fear of the dividend being jeopardized, and the Company had earned its maximum dividend of 6% even during the war; bearing those facts in mind, the Company maintained that the basic dividend also should be well secured. The Company's costs last year, including the cost of the 6% dividend, totalled 5·55d. per therm, but, as had been indicated to the Board of Trade, that figure was abnormally low, for various reasons. For instance, the profits on residuals were abnormally high, and expenditure on repairs and renewals had been abnormally low during the last year or so. A basic price should be based upon normal working figures, and there must be no abnormality in it; the cost of supply in 1932 could not be accepted as being the real cost of gas year in and year out. As showing how an abnormality might arise in any one year, Counsel said that a retort house of the Sunderland Company would cost £24,000 to renew; of that amount, £16,000 represented renewal, and £8000 improvement, so that the £16,000 would be properly charged to revenue.

During the last year the Company had commenced to take a supply of coke oven gas, to the extent of about 25% of the total gas supplied. By reason of that coke oven gas it was cheapening, and hoped to cheapen still further, the general costs of supplying gas, and the Company asked that it should fairly be remunerated for its enterprise. But the shareholders could only receive £1 for every £7 15s. received by the consumers. The contract for the coke oven gas covered a period of fifteen years, but provision had been made in the accounts for keeping the displaced manufacturing plant in reserve, because it could not be assumed that the coke oven gas would still be available to the Company at a reasonable price fifteen years hence, and in any case it was not good business for the Company to place itself completely in the hands of the suppliers of the coke oven gas. A main 7 miles long had had to be provided to carry the coke oven gas to the works, and the proper course was to amortize that main over the period of the contract.

Counsel suggested that in fixing the basic price at 6d. for Sunderland the Board of Trade had fixed it too low, and had not allowed the Company the opportunity of earning any substantial increment of dividend in the future. The general trend of the Corporation's statement was resistant to any suggestion that the Company should have any incentive to reduce the price of gas; it was in the national interest, however, that there should be such an incentive.

As to the suggestion by the Corporation that the maximum price and dividend system should be retained, Counsel said he had not thought that anybody still desired to retain that system.

Mr. S. G. TURNER, K.C. (for the Corporation), said the view he would put forward was that the present was not the proper time for changing over to the basic system.

Mr. WROTTESLEY commented on a suggestion in the petition, that 6% was too high a maximum for preference capital, and that the maximum should be 5%. The safeguard, he said, was that in the interests of the ordinary stockholders the preference stockholders were not offered a higher rate of interest than was necessary to raise the money required.

Another objection by the Corporation was to a proposal to carry half the present reserve fund, amounting to £11,000, to the new reserve fund proposed by the Order. The Corporation urged that, under the terms of the Order, the Company could at once utilize the whole of this sum for the payment of ordinary dividends beyond 6%, whereas the fund had accumulated out of revenue and should not be given to shareholders; and, further, that the money should go to the special purposes or renewal fund proposed to be authorized. Counsel pointed out that the present reserve fund was set up to balance dividends, and to meet any extraordinary claim or demand, so preventing fluctuations in the price of gas. The Company asked to put half of that fund to the new reserve fund, where it would be applicable to equalizing the dividend. Therefore, it was applicable to that extent to one of the principal purposes to which the old fund was applicable. The other half of the present reserve fund would go to the new special purposes fund, applicable to meet charges incurred by reason of accidents, strikes, or other circumstances which due care and management could not have prevented; or the costs of replacement or removal of plant and works other than renewals. The clause was in well-recognized form, and the reserve fund would be built up entirely, in the future, of shareholders' money, so that the consumers could not be hurt.

As to the Corporation's suggestion that the amounts to be added to the special purposes and renewals funds in any year should not be more than ½% of the paid-up capital in each case, instead of the 1% provided for in the Order, Counsel said the justification for 1% was that the Company had a very small capital, and if the amounts that could be added were reduced to ½% the renewal fund, for instance, would not accumulate sufficiently to damp out fluctuations in price due to any costly renewal. The capital of the Company was much less than half the amount that one might reasonably expect, having regard to the assets. Assets should be renewed when the Company's Engineer considered best, and his judgment should not be interfered with because there was not sufficient money in the fund.

EVIDENCE OF MR. GEORGE EVETTS.

Mr. *George Evetts* (Consulting Engineer) gave evidence, and said he was satisfied that the basic system could fairly be applied to the Sunderland Company. The fact that the Company was purchasing a certain amount of coke oven gas was not a reason against applying the basic system to this Company; the only case he knew of in which Parliament had refused to apply it was that of a small Company which, having secured a supply of coke oven gas, had only half-a-dozen men left at its works. The Sunderland Company, however, would continue to employ a large number of men, and about 75% of the gas supplied would be manufactured by the Company. The estimates he had put forward to the Board of Trade related to a normal year, and not 1932, and he did not know of any case where a basic price was based on the results of a favourable year.

Referring to the low capital expenditure of the Sunderland Company, he said that if the Company were to be penalized because it had been efficient in the past, then it would seem that companies which financed their undertakings extravagantly would do better for themselves. The cost of the basic dividend in the case of Sunderland was 0·65d. per therm, so that if the capital of the Company were double its present figure and a further 0·65d. per therm were added in respect of dividend, apparently no complaint would have been made. It seemed that the bigger the price asked for, the better one was served.

Mr. TURNER, cross-examining, said that if the basic price of 6d. were applied, then on the 1932 results the Company would have been authorized to pay a dividend of £6 9s. 3d.%, and there were sufficient profits to enable that to be paid. If, however, the basic price had been 6½d., the authorized dividend would have been £6 18s., but he was not sure that sufficient profits were available to pay that.

Mr. *Evetts* said it did not follow that the Company would necessarily have paid those amounts.

Tuesday, May 23.

Mr. S. G. TURNER, K.C., continuing his cross-examination of Mr. Evetts, said the Company's figures showed that during the six years from 1927 to 1932 the expenditure on repairs of works had been falling steadily, and he suggested that costs were not

likely to be restored to the level which obtained at the beginning of the six years' period.

Mr. *Evetts* said his opinion was very definitely that they would be; the slight fall in costs was not likely to last.

In reply to further questions, he said it was impossible to say definitely what would happen. The year 1932 was a remarkably cheap year of operation for the Company.

Questioned with regard to a figure of 0·27d. per therm, representing savings effected during 1932, and in respect of which he claimed that the Company should be given advantage in building up the basic price, he said that one large element in it was £4500, which was the net saving resulting from the taking of coke oven gas. Other elements were improved carbonization, the saving of labour in the retort house, and reduction of unaccounted-for gas.

Mr. TURNER said his general criticism was that it was not possible for anybody to build up an actual basic price figure to-day. If other collieries in the Sunderland district installed coke oven plant two or three years hence, the Gas Company might double its purchases of coke oven gas. The case of the Company, he understood, was that even if it were able to purchase coke oven gas to the extent of 100% of its requirements, it was entitled to the full benefit of that because it was the outcome of its enterprise.

Mr. *Evetts* replied that definitely it was. Anybody who knew anything about negotiating contracts for supplies of coke oven gas appreciated that business enterprise and technical skill were involved to the very highest degree. Negotiations sometimes occupied weeks, and even months. If these savings were not admissible as a factor of advantage in arriving at the basic price and dividend, then no savings at all were admissible.

Mr. TURNER said that the figures put forward by Mr. Evetts to the Committee were different from those he had placed before the Board of Trade last autumn. He suggested, therefore, that it was not possible to-day to arrive at figures of such certainty that it would be safe to base upon them a basic price which could only be varied in future in respect of circumstances beyond the control of the Company.

Mr. *Evetts* pointed out that since his figures were presented to the Board of Trade the results of the year 1932 had become available.

Mr. WROTTESLEY, re-examining, said that one of the advantages of the basic system was that it encouraged gas companies to look for a new type of business—*i.e.*, industrial business—and it was necessary to create a new organization in order to secure that business. The Sheffield Gas Company, which was using coke oven gas, had set up a very special organization for the industrial business, and had devoted a great deal of energy and skill to it.

Mr. *Evetts* said that the Birmingham undertaking had done that also in respect of its manufactured gas.

Mr. WROTTESLEY added that under the maximum price and maximum dividend system there was no inducement to go out for that type of business.

Mr. *A. W. White*, F.C.A. (Partner in Messrs. Cash, Stone, & Co., Chartered Accountants), gave evidence on behalf of the Company, and gave a summary of the Company's published accounts. The Company, he said, had not been setting aside sums adequate to meet any heavy expenditure which might be impending.

Mr. WROTTESLEY asked if the policy of the Company had been to maintain a low price of gas, although faced with a possibly fairly heavy expenditure in the not far distant future.

Mr. *White* expressed the opinion that if times had been better the Directors would have charged a higher price for gas.

Witness put forward a table showing the calculation for arriving at the basic price, the figure he arrived at being 6·07d. per therm.

Mr. TURNER, cross-examining, referred to a sum of £11,000, representing half the existing reserve fund, which under the terms of the Order was to be transferred to the proposed new reserve fund. He pointed out that that amount would be available not merely to pay the authorized dividend in any year when the revenue was not sufficient, but it could also be used to increase the dividend above the authorized dividend.

Mr. *White* replied that it might be.

Mr. TURNER suggested that in the past the Company had always been able to pay the maximum dividend, without resort to the reserve fund.

Mr. *White* said he was not sure whether or not the Company had had to draw on the fund for that purpose at any time.

Mr. TURNER said the Corporation had no objection to the £11,000 being earmarked to secure the payment of the prescribed dividend; but it objected to the use of the money for the payment of a dividend beyond the authorized figure.

Mr. TURNER, referring to the calculation of the basic price, said the figure representing the cost of coke oven gas was based on the assumption that the present price would continue, whereas the contract provided for a reduction of price after a certain amount had been taken. He urged that that should have been taken into consideration in estimating a basic price which was to apply in the future.

Mr. *White* said he did not think so.

Mr. TURNER asked if witness would say that the basic price ought to be fixed on the basis of to-day's circumstances, without regard to the possibility that in the course of the next two or three years the Company might arrange to obtain all the gas it required from coke ovens, and would not itself manufacture any gas.

Mr. *White* replied that he would.

(To be continued.)

Owing to pressure on our columns, the remainder of the Report of the Sunderland Special Order, together with that of the Chester Company's Order, has unavoidably been held over.

Watford Gas Company's Special Order.

All Opposition Withdrawn.

The public inquiry which was to have been held at the Board of Trade Offices, Westminster, on Friday, May 25, into the provisions of the Watford Gas Company's draft Special Order was found to be unnecessary, for at the last moment a communication was handed to Mr. J. F. Ronca (Director of Gas Administration) announcing that all opposition was withdrawn.

The object of the Order is to sanction the transfer, by agreement, of the undertaking of the Harpenden District Gas Company to the Watford and St. Albans Gas Company as from July 1, 1933, the consideration for the transfer being the substitution of Watford stock for Harpenden stock.

Originally there were objections by the Hertfordshire County Council, the Watford Corporation, and the Harpenden Urban District Council, but agreement was reached by the parties with regard to the matters at issue, and the objections were withdrawn.

The Order gives power to the Watford Company to create new stock necessary to replace the Harpenden stock, and an additional £120,000. The Watford Company is to take over the unexercised capital of the Harpenden Company and its mortgage debentures.

There is also provision for compensation to the Directors of the Harpenden Company (other than the Managing Director) by the payment of a sum equal to seven times their fees in 1931; to the Auditor and Accountant to the extent of three times the 1931 fees; and to the Engineer, Manager, and Secretary (this is one joint office), a sum to be agreed or determined by arbitration.

Mr. W. F. Hillier (Assistant Engineer and Manager) and Mr. F. Roberts (Chief Clerk) are to be employed, if they be willing, by the Watford Company at salaries and emoluments not less than they are receiving from the Harpenden Company, and shall be eligible as members of the Watford Company's Co-Partnership and Pension Schemes. The Watford Company is also to employ such members of the office staff of the Harpenden Company as may be required, and they also shall be eligible for membership of the Co-Partnership Fund and for participation in the Pension Scheme.

Provision is made in the Order for the charging of differential prices in the Harpenden area as compared with the Watford area.

(The Board of Trade will now consider the terms of the Order in detail, and present it to Parliament for approval, with or without amendment, in due course.)

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Lords.

Private Bills.

The Commercial Gas Bill and the Gas Light and Coke Company Bill have been brought from the Commons, read a first time, and referred to the Examiners who are meeting to consider them on May 30.

Special Orders.

The Hastings and St. Leonards Gas Order has been laid before the House and referred to the Special Orders Committee.

The Sunderland Gas Order was considered by a Select Committee on May 26.

House of Commons.

Private Bills.

The East Hull Gas Bill has been passed by the Examiners and put down for second reading on May 29.

Special Orders.

A Special Order on the application of the Hastings and St. Leonards Gas Company has been presented and ordered to lie upon the Table of the House.

Plans have been deposited in connection with the Cirencester Gas Order.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The new Account opened on the Stock Exchange last week with considerable activity in industrial shares which continued right up to the close on Saturday. There was heavy selling of gilt-edged securities by small holders to finance the new commitments, bringing with it a relapse in British Funds, though these substantially recovered in the last session. At the present time there appears little justification for this wave of speculation, which commenced on Wall Street, extending to this country, and until some solution of the world's more pressing economic problems has been found, and to this end much may be achieved by the coming World Conference, extreme caution is undoubtedly necessary.

Investors in Gas stocks and shares being in the main permanent holders, the activity in the more speculative sections had little effect on the market. The volume of business was about normal, and prices showed very few fluctuations either way. Bombay £1 shares more than recovered the *ex* div. reduction and gained 1s. to 26s., while a rise of one point each was recorded on the Bristol Exchange in the Bristol and Newport (Mon.) 5% maximum stocks. European also gained one point on the London Exchange to 132½, and Malta and Mediterranean £5 shares rose ½ to 10. On the local Exchange, Newcastle units fell 6d. to 24s. 6d., and the 4% preference a fraction to par. Gas Light 4% preference was marked down 2 points to 100½, at which price a holding is an attractive proposition; the highest price reached by this stock during the current year was 104½ in April.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *May* 29.

The position in the tar products market is as follows:

Pitch remains quiet, and the price is called about 85s. per ton f.o.b.

Creosote is proving of interest for fuel purposes, and the price is firm at 3d. per gallon.

Refined tar is about 4d. to 4¼d. per gallon in bulk at makers' works.

Benzole and solvent naphtha have been affected by the recent drop in the price of petrol; pure benzole being about 1s. 9d. per gallon, and solvent naphtha, 95/160, about 1s. 6d.; pure toluole, about 2s. 3d.; and 90/140 pyridine bases, 3s. 6d. to 3s. 9d. per gallon naked at makers' works.

Tar Products in the Provinces.

May 29.

The average prices of gas-works products during the week were: Gas-works tar, 32s. 6d. to 37s. 6d. Pitch—East Coast, 80s. to 82s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 80s. to 82s. 6d.* Toluole, naked, North, 1s. 9d. to 1s. 10d. Coal-tar crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2d. to 2¼d.; low gravity, 1¼d.; Scotland, 2d. to 2½d. Heavy oils, in bulk, North, 4d. to 4½d. Carbolic acid, 60's, 2s. 9d. to 2s. 10d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40% purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o b. In order to arrive at the f.a s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *May* 27.

Refined tar is receiving considerable attention, but other products remain rather quiet with prices easy in tone.

Crude gas-works tar.—The actual value is 42s. 6d. to 47s. 6d. per ton *ex* works.

Pitch.—Nominal export value is now 75s. to 77s. 6d. per ton f.o.b. Glasgow. In the home market, round 75s. per ton *ex* works in bulk is being quoted.

Refined tar to Ministry of Transport Specification is in steady demand at 3¼d. to 3¾d. per gallon f.o.r. naked, according to quantity.

Creosote oil.—Prices are reasonably steady. B.E.S.A. Specification is 2¼d. to 2¾d. per gallon; low gravity, 2d. to 2½d. per gallon; and neutral oil, 2½d. to 2¾d. per gallon—all in buyers' rail tanks *ex* works.

Cresylic acid.—Few orders are in hand. but quotations are unchanged. Pale, 97/99%, is 10d. to 11d. per gallon; dark, 97/99%, 9d. to 10d. per gallon; and pale, 99/100%, 1s. 1d. to 1s. 2d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha.—To-day's value is 4d. to 4½d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 3d. to 1s. 4d. per gallon, and 90/190 grade 11d. to 1s. per gallon *ex* works.

Motor benzole.—Supplies being scarce price remains at 1s. 4d. to 1s. 5d. per gallon *ex* works in bulk.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole	0	9	to	0	9½	per gallon at works
Motor ,,	1	4	,,	1	4½	,, ,, ,,
Pure ,,	1	7½	,,	1	8	,, ,, ,,

Trade Notes.

Wagon-Tipping Apparatus.

An agreement has been concluded between the Underfeed Stoker Company, Ltd., and Mr. Henry D. Waldram to manufacture and sell a special form of wagon-tipping apparatus.

Messrs. Robert Dempster & Sons, Ltd., Open London Office.

Messrs. Robert Dempster & Sons, Ltd., of Rose Mount Iron Works, Elland, have opened an Office at 16, Queen Anne's Gate, Westminster, S.W. 1, and have appointed Mr. S. Langford as their London Representative.

Contracts for Halifax.

The following contracts for gas-works plant have been recommended for acceptance by the Halifax Gas Committee: Gasholder, Messrs. R. Dempster & Sons, Ltd., Elland; coke storage bunkers and conveyors, Messrs. Drakes, Ltd., Halifax; and carburetted water gas plant, Messrs. Humphreys & Glasgow, Ltd., London.

Contracts Advertised To-Day.

Coal.

Hebden Bridge and Mytholmroyd Gas Board. [p. 638.]
Penrith Urban District Council. [p. 638.]
Sutton-in-Ashfield Urban District Council. [p. 636.]

Gasholder Painting.

Manchester Corporation Gas Department. [p. 636.]

Mantles.

Sutton-in-Ashfield Urban District Council. [p. 636.]

Oil and Engine Waste.

Sutton-in-Ashfield Urban District Council. [p. 636.]

Pipes, Specials, and Fittings.

Sutton-in-Ashfield Urban District Council. [p. 636.]

Tar.

Loughborough Gas Department. [p. 638.]

New Capital Issues.

Godalming Gas and Coke Company, Ltd.—As will be seen from our advertisement columns, Messrs. A. & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender, on behalf of the Directors of this Company, 3160 £5 5% preference shares at a minimum price of issue of par. Tenders for this issue must be received not later than 11 a.m. on Tuesday, June 13.

The Guernsey Gas Light Company, Ltd., show a balance at credit of profit and loss account for the year ended March 31, 1933, after paying the interest on debenture bonds and making the allocations shown in the accounts of £16,128. The Directors have fixed the dividend at 17s. 6d. per share, which will absorb £6562 gross, leaving a balance of £9565 to be carried forward. The increase in gas sold this year amounts to 7,809,900 c.ft., while the number of consumers has increased by 205, making the total at the year end 6677. The policy of renewing and enlarging mains has been continued. In the year under note, some 2159 yards of mains have been dealt with. In addition, the Company have laid 3742 yards of new mains, including a 14-in. continuously welded steel feeder main from the works to the Grange which will augment the supply in all the upper areas. The total mileage of mains is now 62.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. May 27. (Provincial Exchanges May 26.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Apl. 3	7⅞	7	Alliance & Dublin Ord. ...	117—127	...	...
374,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb. ...	85—95	...	...
557,655	,,	Mar. 6	7	7	Barnet Ord. 7 p.c.	157—162	...	159—161
300,000	1	May 8	1/4½	1/9½	Bombay, Ltd.	25/—27/-	+1/-	25/6—25/9
178,380	Stk.	Feb. 20	9½	9½	Bournemouth sliding scale	195—205	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	157—162	...	...
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	137—142	...	140—142
50,000	,,	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75—80	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	101—106	...	...
210,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	122—127	...	...
357,900	,,	Mar. 6	7½	7½	Brighton, &c. 6 p.c. Con. ...	152—157	...	...
540,000	,,	,,	6½	6½	Do. 5 p.c. Con. ...	141—146	...	...
195,500	,,	,,	6	6	Do. 6 p.c. B Pref.	136—141	...	136
1,487,500	,,	Mar. 6	5	5	Bristol 5 p.c. max.	112—114*a*	+1	...
120,420	,,	Dec. 19	4	4	Do. 1st 4 p.c. Deb. ...	100½—101½*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100½—101½*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120—124*a*	...	...
855,000	,,	Apl. 3	7	8	British Ord.	147—152	...	148—150
100,000	,,	Dec. 19	7	7	Do. 7 p.c. Pref.	147—152	...	...
350,000	,,	,,	—	5½	Do. 5½ p.c. Pref. ...	105—110	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	105—115	...	...
160,000	,,	Jan. 9	5	5	Cambridge 5 p.c. Deb. ...	117—122	...	...
100,000	10	May 22	6	4	Cape Town, Ltd.	7—8†	...	7½
100,000	10	Apl. 24	4½	4½	Do. 4½ p.c. Pref. ...	6—7	...	...
150,000	Stk.	Dec. 19	4½	4½	Do. 4½ p.c. Deb. ...	88—93	...	...
626,860	,,	Feb. 20	6	6	Cardiff Con. Ord.	119—124	...	...
237,860	,,	Jan. 9	2½	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Feb. 20	5	6½	Chester 5 p.c. Ord.	99—105*b*	...	...
98,936	1	May 22	2/-	2/-	Colombo, Ltd. Ord....	25/—80/-*	...	28/6
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	18/6—20/6*	—/6	...
609,204	1	Mar. 20	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	18/6
296,053	1	,,	1/3'30	1/3'30	Do. 8 p.c. Pref.	20/—22/-	+/6	...
1,796,955	Stk.	Feb. 20	5	6½	Commercial Ord.	112—117	...	116½
475,000	,,	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75—80	...	...
265,272	,,	Mar. 6	—	5	Do. 5 p.c. Deb. ...	120—125	...	123
807,560	,,	Feb. 20	7	7	Croydon sliding scale ...	145—150	...	148½—149½
469,590	,,	,,	5	5	Do. max. div.	101—106	...	...
500,000	,,	Jan. 9	5	5	Do. 5 p.c. Deb.	120—125	...	124
542,270	,,	Mar. 6	7	10	Derby Con.	150—160*c*	...	...
55,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb.	80—85*c*	...	...
209,000	,,	Mar. 6	5	5	East Hull Ord. 5 p.c. ...	106—111	...	...
179,500	,,	Mar. 6	6	6	East Surrey Ord. 5 p.c. ...	120—125	...	...
155,019	,,	Dec. 19	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
1,002,180	,,	Apl. 3	†5	†7	European, Ltd.	130—135	+1	132—133½
19,373,992	,,	Feb. 20	5⅝	5⅞	Gas Light & Coke 4 p.c. Ord.	25/—26/-*f*	...	25/4½—25/10½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	86—89	...	87—88
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	99—102	—2	100—102
6,102,497	,,	Dec. 19	3	3	Do. 3 p.c. Con. Deb. ...	79—82	...	80—81½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—118	...	115½—117
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	112—115	...	112⅝—113
270,466	,,	Mar. 6	6	6	Harrogate New Cons. ...	113—118	...	...
82,500	,,	Mar. 6	7	7	Hastings & St. L. 5 p.c. Conv.	138—143	...	...
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	110—115	...	111½
70,000	10	Apl. 24	‡10	‡10	Hongkong & China, Ltd. ...	14—15	...	...
218,200	Stk.	Mar. 6	6	6	Hornsey Con. 3½ p.c. ...	122—127	...	...
5,600,000	,,	May 22	10	14	Imperial Continental Cap.	205—215*	...	207—212½
223,130	,,	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb.	89—94	...	...
235,242	,,	Mar. 6	8½	8½	Lea Bridge 5 p.c. Ord. ...	170—175	...	171½—172½
2,145,907	,,	Mar. 6	6	6	Liverpool 5 p.c. Ord. ...	125—126*b*	...	...
245,500	,,	Dec. 19	5	5	Do. 5 p.c. Red. Pref. ...	105—115*b*	...	...
306,083	,,	Jan. 19	4	4	Do. 4 p.c. Deb. ...	101—103*b*	...	...
165,736	,,	Feb. 20	8	10	Maidstone 5 p.c. Cap. ...	180—200	...	...
56,176	,,	Dec. 19	3	3	Do. 3 p.c. Deb. ...	70—75	...	...
75,000	5	Dec. 5	‡10	‡10	Malta & Mediterranean ...	9—11	+½	10⅜
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Mar. 6	5	5	M. S. Utility "C." Cons. ...	103—108	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95—100	...	95—97½
112,126	,,	Jan. 9	4	4	Do. 4 p.c. Deb. ...	102—104	...	...
148,955	,,	,,	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
675,000	,,	21 May '31	‡6	‡6	Montevideo, Ltd.	50—60	...	54½—55
2,061,315	,,	Mar 6	5	5½	Newcastle & Gateshead Con.	24/8—24/9*d*	—/6	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—101*d*	—½	...
776,706	,,	Jan. 9	3½	3½	Do. 3½ p.c. Deb. ...	90—92*d*	...	...
277,285	,,	May 8	5	5	Do. 5 p.c. Deb. '48...	107—109*d**	...	...
274,000	,,	Feb. 20	5	5	Newport (Mon.) 5 p.c. max.	100—102*a*	+1	...
204,940	,,	Mar. 20	7½	7½	North Middlesex 6 p.c. Con.	132—142	...	...
396,160	,,	Feb. 6	5	5	Northampton 5 p.c. max. ...	103—108	...	...
300,000	,,	Apl. 24	9	7	Oriental, Ltd.	114—119	...	115
205,162	,,	Dec. 19	8	8	Plym'th & Stonehouse 5 p.c.	155—165	...	...
504,416	,,	Feb. 20	8	8	Portsm'th Con. Stk. 4 p.c. Std.	160—165	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	104—109	...	107½
114,000	,,	Feb. 20	5	5	Preston 5 p.c. Pref.	103—108	...	...
686,812	,,	Jan. 23	4	4	Primitiva 4 p.c. Rd. Db. 1911	80—85	...	...
389,813	,,	Dec. 19	4	4	Do. 4 p.c. Cons. Deb.	80—85	...	82½
150,000	10	Mar. 20	6	6	San Paulo 6 p.c. Pref. ...	6⅞—7⅛	...	...
1,738,968	Stk.	Sept. 5	6	6	Sheffield Cons.	122—124*e*	...	...
95,000	,,	Jan. 9	4	4	Do. 4 p.c. Deb.	91—95*e*	...	...
133,201	,,	Feb. 20	8½	5	Shrewsbury 5 p.c. Ord. ...	125—130	...	...
90,000	10	June 6	15	15	South African	3—5	...	3½
6,709,895	Stk.	Feb. 20	5	7	South Met. Ord.	125—129	...	125—126⅜
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	137—142	...	137—138
850,000	,,	,,	—	20/-*g*	Do. 4 p.c. Irred. Pf.	100—104	...	100½
1,895,445	,,	Jan. 9	3	3	Do. 3 p.c. Deb. ...	79—82	—1	81
1 000,000	,,	Jan. 23	5	5	Do. 5 p.c. Red. Deb.	114—117	...	114½—116
209,820	,,	Mar. 6	8½	8½	South Shields Con.	147½—152½*d*	...	...
1,543,795	,,	Feb. 20	6	6	South Suburban Ord. 5 p.c.	124—129	...	...
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	...	115½—117½
868,837	,,	Dec. 19	5	5	Do. 5 p.c. Deb.	120—125	...	121—123
647,740	,,	Feb. 20	5	5	Southampt'n Ord. 5 p.c. max.	107—112	...	110—112
121,275	,,	Dec. 19	4	4	Do. 4 p.c. Deb.	100—105	...	...
350,000	,,	Mar. 6	9/-	5½	Swansea 5½ p.c. Red. Pref.	108—112	...	...
200,000	,,	Dec. 19	6½	6½	Do. 6½ p.c. Red. Deb.	105—110	...	108—108½
1,076,490	,,	Mar. 6	6½	6½	Tottenham and District Ord.	142—147	...	142—145
300,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	123—128	...	123—125
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	113½—114½
199,005	,,	Dec. 19	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
85,701	,,	Apl. 3	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	80—85	...	...
347,769	,,	Mar. 6	7	7	Uxbridge, &c., 5 p.c. ...	140—145	...	...
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,322,220	,,	Mar. 6	7	7	Wandsworth Consolidated	145—150	...	148½—148⅝
1,096,373	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	113—113½
1,317,964	,,	Dec. 19	5	5	Do. 5 p.c. Deb.	120—125	...	122—123½
158,400	,,	Mar. 6	5	6⅄	Winchester W.&G.5p.c.Con.	109—114	...	112

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—For quarter. *h.*—Paid £3, including 10s. on account of back dividends. *Ex. div. † Paid free of income-tax. ‡ For year.

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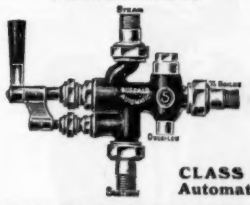

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TO CORRESPONDENTS: No notice can be taken of anonymous communications, unless authenticated by the name and address of the writer (not necessarily for publication).

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NOON ON TUESDAY is the latest hour for receipt of advertisement copy for the following day's issue.

FIRST POST ON MONDAY is the latest for receipt of alterations of standing advertisements.

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A copy of the "G.J." Calendar and Directory is presented to Continuous Subscribers.

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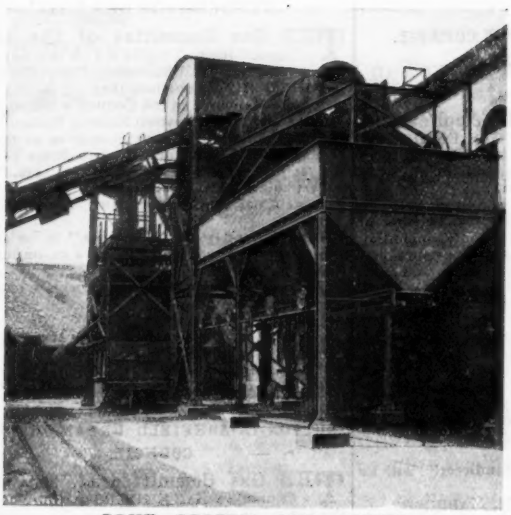

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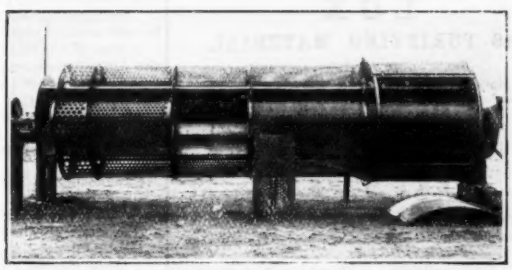

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(See illustrated advertisement May 24, p. 445.)

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(See advertisement last week, p. 480.)

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THE above Fellowship, which is maintained by Radiation Limited for Research in Gaseous Fuel and Combustion, will be Vacant as from 1st October next.
Conditions may be obtained from the COLLEGE REGISTRAR, who will receive Applications up to Friday, 23rd June next.

APPOINTMENTS, &c., VACANT.

TIPTON URBAN DISTRICT COUNCIL.

APPOINTMENT OF GAS ENGINEER AND MANAGER.

THE above Council invite Applications for the Appointment of GAS ENGINEER and MANAGER at a commencing Salary of £450 per Annum, rising by annual increments of £25 to a maximum of £600 per Annum.
Applicants must be between 30 and 50 years of age and must possess a thorough knowledge of Modern Gas Manufacture and Supply, including Vertical Retorts and all classes of Constructional Work connected with a gas undertaking, and must also possess sound Commercial Experience.
The Appointment will be subject to termination by two months notice on either side.
Forms of Application and further particulars of the Appointment can be obtained from the undersigned on receipt of a stamped addressed envelope.
Applications, accompanied by *copies* of not more than Three recent Testimonials, must reach the undersigned not later than first post on Monday, 12th June, 1933.
Canvassing, either directly or indirectly, will be a disqualification.

KENNETH W. MADIN,
Solicitor and Clerk to the Council.
Public Offices,
Owen Street,
Tipton,
May 24, 1933.

WESTBURY GAS AND COKE COMPANY, LIMITED.

ANNUAL MAKE ABOUT 30 MILLIONS.

THE Directors require the Services of a fully qualified MANAGER and SECRETARY, to take office as from 25th June, 1933.
Applications, stating Age, Capabilities, Details of Experiences, Salary required, together with Three recent Testimonials, to be sent to the CHAIRMAN, GAS OFFICES, WESTBURY, WILTS.

WORKS Manager (Assistant) Wanted to Control 400-500 Hands. Knowledge of Modern Repetition Methods, Brass and Sheet Metal Work, and Organizing Experience essential.
Write, stating Age, Experience, and Salary expected, also *copy* Testimonials, to No. 999, c/o JOHN MENZIES & CO., LTD., 90, WEST NILE STREET, GLASGOW.

HINCKLEY URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

TECHNICAL Assistant and Chemist required by the above Council, with Experience of Gas-Works Laboratory and W.D. Plant. Commencing Salary, £200.
Applications, which must be received before June 12, stating Age (not exceeding 30 years), Qualifications, Experience, and accompanied by *copies* of not more than Three recent Testimonials, and endorsed "Technical Assistant," to be addressed to the MANAGER, GAS-WORKS, HINCKLEY.

CONTRACTS OPEN.

MANCHESTER CORPORATION.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the Work required to be done in the CLEANING AND PAINTING of the Waterless Gasholder at their Bradford Road Works.
Specification and Form of Tender may be obtained on application to Mr. J. H. Sillitoe, Commercial Manager and Secretary, Gas Department, Town Hall, Manchester.
The Gasholder may be inspected and any other information obtained on application to Mr. A. L. Holton, Chief Engineer, Gaythorn Gas-Works, Manchester.
Sealed Tenders, addressed to the Chairman of the Gas Committee and endorsed "Tender for Cleaning and Painting Waterless Gasholder," must be delivered at the Gas Offices, Town Hall, Manchester, not later than 5 p.m. on Thursday, the 15th June, 1933.
The Gas Committee do not bind themselves to accept the lowest or any Tender.

By order,
F. E. WARBRECK HOWELL,
Town Clerk.
Town Hall,
Manchester,
May, 1933.

SUTTON-IN-ASHFIELD URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL.

THE Gas Committee of the above Council invite TENDERS for the Supply of 9000 Tons of Well-Screened GAS COAL or WASHED NUTS, not less than 1¼ in. to 3 in. in size, to be delivered at the Council's Siding at the London and North Eastern Railway Station (Great Northern Section) in such quantities as the Gas Manager shall from time to time direct between the 1st July, 1933, and the 30th June, 1934.
Particulars of the estimated yield of Gas per Ton of Coal Carbonized must accompany all Tenders.
Tenders, endorsed "Gas Coal," to be sent to the undersigned not later than 10 a.m. on the 12th day of June, 1933.
The Committee do not bind themselves to accept the lowest or any Tender.

LUTHER PEPPER,
Clerk to the Council.
Portland Square,
Sutton-in-Ashfield,
May 17, 1933.

SUTTON-IN-ASHFIELD URBAN DISTRICT COUNCIL.

THE Gas Committee of the above Council invite TENDERS for the Supply of the following Requirements, in such Quantities as the Gas Manager shall from time to time direct, extending over a period of Twelve Months commencing on the 1st July, 1933—namely:

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Tenders, endorsed "Requirements," to be delivered to the undersigned not later than 10 a.m. on the 12th day of June, 1933.
The Council do not bind themselves to accept the lowest or any Tender.

LUTHER PEPPER,
Clerk to the Council.
Portland Square,
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May 17, 1933.

(Continued on p. 638.)

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CONTRACTS OPEN.—*Continued.*

PENRITH URBAN DISTRICT COUNCIL.

THE Gas Committee of the above Council invite TENDERS for the Supply of approximately 6300 Tons WASHED GAS COAL, required during the Twelve Months ending 30th June, 1934.

Form of Tender and particulars to be obtained from the Gas Engineer, Mr. J. Corrigan, Gas-Works, Old London Road, Penrith.

Sealed Tenders, endorsed "Coal Tender," to be delivered to the undersigned not later than Twelve noon, Monday, June 5, 1933.

The Committee do not bind themselves to accept the lowest or any Tender.

(Signed) GEORGE WAINWRIGHT,
Town Clerk.

Town Hall,
Penrith,
May 18, 1933.

HEBDEN BRIDGE AND MYTHOLMROYD GAS BOARD.

TENDERS are invited for the Supply of 7000 Tons of GAS NUTS, to be delivered at the Gas-Works Sidings, Hebden Bridge Station (L.M.S.R.), in such monthly quantities as may be required during the Twelve Months July 1, 1933, to June 30, 1934.

Forms of Tender can be obtained on application to Mr. T. H. Nield, Engineer and Manager, Carlton Street, Hebden Bridge.

Sealed Tenders, endorsed "Tender for Gas Coal," must be delivered to the undersigned not later than first post on Tuesday, the 13th of June, 1933.

The Board do not bind themselves to accept the lowest or any Tender.

SAM OGDEN,
Clerk of the Board.

Carlton Street,
Hebden Bridge,
May 27, 1933.

LOUGHBOROUGH CORPORATION.
(GAS DEPARTMENT.)

TENDER FOR TAR.

THE Gas Committee of the Lough- borough Corporation invite TENDERS for the PURCHASE of the SURPLUS TAR made at their Works during the Twelve Months from 1st July, 1933, to 30th June, 1934.

Estimated amount of Tar, 600 Tons.

The Corporation to deliver either into Contractor's Boats at Canal Wharf or into Contractor's Tanks at the L.M. & S. Nottingham Road Station, L.M. & S. Derby Road Station, or L. & N.E. Station, Loughborough.

Tenders to be endorsed "Tender for Tar," and addressed to W. S. A. Robinson, Esq., Town Clerk, Town Hall, Loughborough, not later than Tuesday, June 13, 1933.

The Committee do not bind themselves to accept the highest or any Tender.

EDWARD ONIONS,
Engineer and Manager.

Loughborough,
May 27, 1933.

COMPANY NOTICES.

THE GAS LIGHT AND COKE COMPANY.

NOTICE is Hereby Given that the TRANSFER BOOKS of this Company, so far as they relate to DEBENTURE STOCKS, WILL BE CLOSED at 12.30 o'clock p.m. on Saturday, the 10th proximo, for the half-year ending on the 30th proximo, and will be RE-OPENED on the morning of Monday, the 12th proximo.

The Interest for the half-year will be remitted by Warrant forwarded by post on the 30th of June next to the Proprietors registered on the Closing of the Books or their authorized Agents.

By order,
WILLIAM LYLE GALBRAITH,
Secretary.

Chief Office:
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Second Impression

The authors commenced this book with a belief and an aim. The belief is that a knowledge of the *principles* of gas utilization is a *sine qua non* of effective salesmanship in the Gas Industry; the aim was to deal simply and logically with these principles. Quite definitely the result bears no relation to a catalogue of gas-using appliances, but it is hoped that, with this book as a first step, the reader will in some measure be fitted to interpret the mechanism of gaseous combustion, to differentiate between good and bad apparatus and good and bad installation, and to appreciate underlying reasons for modification in design. It is hoped, too, that the book will be of immediate service to the younger members of the Gas Industry who, keen on their work, are embarking on the various examinations which assist in establishing a useful career in the Industry. It should be of special utility to those in the Second and Third Years (S2 and S3) of the Institution of Gas Engineers' Major Course in Gas Supply, and for those in the Third Year of the Minor Course in Gas Supply Practice.—*Extract from the Authors' preface.*

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